

Optima CT680 Series Installation Manual

(Book 1 of 2)



OPERATING DOCUMENTATION



5472001-1EN
Rev. 2

Book 1 of 2: Mechanical Installation

Pages 1 - 202

Effectivity

The information in this manual applies to the following Optima CT Systems:

- Optima CT680 Quantum
- Optima CT680 Expert
- Optima CT680 Professional

IMPORTANT PRECAUTIONS

LANGUAGE

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| ПРЕДУПРЕЖДЕНИЕ (BG) | <p>Това упътване за работа е налично само на английски език.</p> <ul style="list-style-type: none"> Ако доставчикът на услугата на клиента изиска друг език, задължение на клиента е да осигури превод. Не използвайте оборудването, преди да сте се консултирали и разбрали упътването за работа. Неспазването на това предупреждение може да доведе до нараняване на доставчика на услугата, оператора или пациента в резултат на токов удар, механична или друга опасност. |
| 警告 (ZH-CN) | <p>本维修手册仅提供英文版本。</p> <ul style="list-style-type: none"> 如果维修服务提供商需要非英文版本，客户需自行提供翻译服务。 未详细阅读和完全理解本维修手册之前，不得进行维修。 忽略本警告可能对维修人员，操作员或患者造成触电、机械伤害或其他形式的伤害。 |
| 警告 (ZH-HK) | <p>本服務手冊僅提供英文版本。</p> <ul style="list-style-type: none"> 倘若客戶的服務供應商需要英文以外之服務手冊，客戶有責任提供翻譯服務。 除非已參閱本服務手冊及明白其內容，否則切勿嘗試維修設備。 不遵從本警告或會令服務供應商、網絡供應商或病人受到觸電、機械性或其他危險。 |
| 警告 (ZH-TW) | <p>本維修手冊僅有英文版。</p> <ul style="list-style-type: none"> 若客戶的維修廠商需要英文版以外的語言，應由客戶自行提供翻譯服務。 請勿試圖維修本設備，除非 您已查閱並瞭解本維修手冊。 若未留意本警告，可能導致維修廠商、操作員或病患因觸電、機械或其他危險而受傷。 |
| UPOZORENJE (HR) | <p>Ovaj servisni priručnik dostupan je na engleskom jeziku.</p> <ul style="list-style-type: none"> Ako davatelj usluge klijenta treba neki drugi jezik, klijent je dužan osigurati prijevod. Ne pokušavajte servisirati opremu ako niste u potpunosti pročitali i razumjeli ovaj servisni priručnik. Zanemarite li ovo upozorenje, može doći do ozljede davatelja usluge, operatera ili pacijenta uslijed strujnog udara, mehaničkih ili drugih rizika. |
| VÝSTRAHA (CS) | <p>Tento provozní návod existuje pouze v anglickém jazyce.</p> <ul style="list-style-type: none"> V případě, že externí služba zákazníkům potřebuje návod v jiném jazyce, je zajištění překladu do odpovídajícího jazyka úkolem zákazníka. Nesnažte se o údržbu tohoto zařízení, aniž byste si přečetli tento provozní návod a pochopili jeho obsah. V případě nedodržování této výstrahy může dojít k poranění pracovníka prodejního servisu, obslužného personálu nebo pacientů vlivem elektrického proudu, respektive vlivem mechanických či jiných rizik. |

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| ADVARSEL (DA) | <p>Denne servicemanual findes kun på engelsk.</p> <ul style="list-style-type: none"> • Hvis en kundes tekniker har brug for et andet sprog end engelsk, er det kundens ansvar at sørge for oversættelse. • Forsøg ikke at servicere udstyret uden at læse og forstå denne servicemanual. • Manglende overholdelse af denne advarsel kan medføre skade på grund af elektrisk stød, mekanisk eller anden fare for teknikeren, operatøren eller patienten. |
| WAARSCHUWING (NL) | <p>Deze onderhoudshandleiding is enkel in het Engels verkrijgbaar.</p> <ul style="list-style-type: none"> • Als het onderhoudspersoneel een andere taal vereist, dan is de klant verantwoordelijk voor de vertaling ervan. • Probeer de apparatuur niet te onderhouden alvorens deze onderhoudshandleiding werd geraadpleegd en begrepen is. • Indien deze waarschuwing niet wordt opgevolgd, zou het onderhoudspersoneel, de operator of een patiënt gewond kunnen raken als gevolg van een elektrische schok, mechanische of andere gevaren. |
| WARNING (EN) | <p>This service manual is available in English only.</p> <ul style="list-style-type: none"> • If a customer's service provider requires a language other than English, it is the customer's responsibility to provide translation services. • Do not attempt to service the equipment unless this service manual has been consulted and is understood. • Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock, mechanical or other hazards. |
| HOIATUS (ET) | <p>See teenindusjuhend on saadaval ainult inglise keeles.</p> <ul style="list-style-type: none"> • Kui klienditeeninduse osutaja nõuab juhendit inglise keelest erinevas keeles, vastutab klient tõlketeenuse osutamise eest. • Ärge üritage seadmeid teenindada enne eelnevalt käesoleva teenindusjuhendiga tutvumist ja sellest aru saamist. • Käesoleva hoiatuse eiramine võib põhjustada teenuseosutaja, operaatori või patsiendi vigastamist elektrilöögi, mehaanilise või muu ohu tagajärjel. |
| VAROITUS (FI) | <p>Tämä huolto-ohje on saatavilla vain englanniksi.</p> <ul style="list-style-type: none"> • Jos asiakkaan huoltohenkilöstö vaatii muuta kuin englanninkielistä materiaalia, tarvittavan käännöksen hankkiminen on asiakkaan vastuulla. • Älä yritä korjata laitteistoa ennen kuin olet varmasti lukenut ja ymmärtänyt tämän huolto-ohjeen. • Mikäli tätä varoitusta ei noudateta, seurauksena voi olla huoltohenkilöstön, laitteiston käyttäjän tai potilaan vahingoittuminen sähköiskun, mekaanisen vian tai muun vaaratilanteen vuoksi. |
| ATTENTION (FR) | <p>Ce manuel d'installation et de maintenance est disponible uniquement en anglais.</p> <ul style="list-style-type: none"> • Si le technicien d'un client a besoin de ce manuel dans une langue autre que l'anglais, il incombe au client de le faire traduire. • Ne pas tenter d'intervenir sur les équipements tant que ce manuel d'installation et de maintenance n'a pas été consulté et compris. • Le non-respect de cet avertissement peut entraîner chez le technicien, l'opérateur ou le patient des blessures dues à des dangers électriques, mécaniques ou autres. |

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| WARNUNG (DE) | <p>Diese Serviceanleitung existiert nur in englischer Sprache.</p> <ul style="list-style-type: none"> Falls ein fremder Kundendienst eine andere Sprache benötigt, ist es Aufgabe des Kunden für eine entsprechende Übersetzung zu sorgen. Versuchen Sie nicht diese Anlage zu warten, ohne diese Serviceanleitung gelesen und verstanden zu haben. Wird diese Warnung nicht beachtet, so kann es zu Verletzungen des Kundendiensttechnikers, des Bedieners oder des Patienten durch Stromschläge, mechanische oder sonstige Gefahren kommen. |
| ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL) | <p>Το παρόν εγχειρίδιο σέρβις διατίθεται μόνο στα αγγλικά.</p> <ul style="list-style-type: none"> Εάν ο τεχνικός σέρβις ενός πελάτη απαιτεί το παρόν εγχειρίδιο σε γλώσσα εκτός των αγγλικών, αποτελεί ευθύνη του πελάτη να παρέχει τις υπηρεσίες μετάφρασης. Μην επιχειρήσετε την εκτέλεση εργασιών σέρβις στον εξοπλισμό αν δεν έχετε συμβουλευτεί και κατανοήσει το παρόν εγχειρίδιο σέρβις. Αν δεν προσέξετε την προειδοποίηση αυτή, ενδέχεται να προκληθεί τραυματισμός στον τεχνικό σέρβις, στο χειριστή ή στον ασθενή από ηλεκτροπληξία, μηχανικούς ή άλλους κινδύνους. |
| FIGYELMEZTETÉS (HU) | <p>Ezen karbantartási kézikönyv kizárólag angol nyelven érhető el.</p> <ul style="list-style-type: none"> Ha a vevő szolgáltatója angoltól eltérő nyelvre tart igényt, akkor a vevő felelőssége a fordítás elkészítése. Ne próbálja elkezdni használni a berendezést, amíg a karbantartási kézikönyvben leírtakat nem értelmezték. Ezen figyelmeztetés figyelmen kívül hagyása a szolgáltató, működtető vagy a beteg áramütés, mechanikai vagy egyéb veszélyhelyzet miatti sérülését eredményezheti. |
| AÐVÖRUN (IS) | <p>Þessi þjónustuhandbók er aðeins fáanleg á ensku.</p> <ul style="list-style-type: none"> Ef að þjónustuveitandi viðskiptamanns þarfnast annas tungumáls en ensku, er það skylda viðskiptamanns að skaffa tungumálþjónustu. Reynið ekki að afgreiða tækið nema að þessi þjónustuhandbók hefur verið skoðuð og skilin. Brot á sinna þessari aðvörun getur leitt til meiðsla á þjónustuveitanda, stjórnanda eða sjúklings frá raflosti, vélrænu eða öðrum áhættum. |
| AVVERTENZA (IT) | <p>Il presente manuale di manutenzione è disponibile soltanto in lingua inglese.</p> <ul style="list-style-type: none"> Se un addetto alla manutenzione richiede il manuale in una lingua diversa, il cliente è tenuto a provvedere direttamente alla traduzione. Procedere alla manutenzione dell'apparecchiatura solo dopo aver consultato il presente manuale ed averne compreso il contenuto. Il mancato rispetto della presente avvertenza potrebbe causare lesioni all'addetto alla manutenzione, all'operatore o ai pazienti provocate da scosse elettriche, urti meccanici o altri rischi. |
| 警告 (JA) | <p>このサービスマニュアルには英語版しかありません。</p> <ul style="list-style-type: none"> サービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。 このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないでください。 この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。 |

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| 경고 (KO) | <p>본 서비스 매뉴얼은 영어로만 이용하실 수 있습니다.</p> <ul style="list-style-type: none"> 고객의 서비스 제공자가 영어 이외의 언어를 요구할 경우, 번역 서비스를 제공하는 것은 고객의 책임입니다. 본 서비스 매뉴얼을 참조하여 숙지하지 않은 이상 해당 장비를 수리하려고 시도하지 마십시오. 본 경고 사항에 유의하지 않으면 전기 쇼크, 기계적 위험, 또는 기타 위험으로 인해 서비스 제공자, 사용자 또는 환자에게 부상을 입힐 수 있습니다. |
| BRĪDINĀJUMS (LV) | <p>Šī apkopes rokasgrāmata ir pieejama tikai angļu valodā.</p> <ul style="list-style-type: none"> Ja klienta apkopes sniedzējam nepieciešama informācija citā valodā, klienta pienākums ir nodrošināt tulkojumu. Neveiciet aprīkojuma apkopi bez apkopes rokasgrāmatas izlasīšanas un saprašanas. Šī brīdinājuma neievērošanas rezultātā var rasties elektriskās strāvas trieciena, mehānisku vai citu faktoru izraisītu traumu risks apkopes sniedzējam, operatoram vai pacientam. |
| ĮSPĖJIMAS (LT) | <p>Šis eksploatavimo vadovas yra tik anglų kalba.</p> <ul style="list-style-type: none"> Jei kliento paslaugų tiekėjas reikalauja vadovo kita kalba – ne anglų, suteikti vertimo paslaugas privalo klientas. Nemėginkite atlikti įrangos techninės priežiūros, jei neperskaitėte ar nesupratote šio eksploatavimo vadovo. Jei nepaisysite šio įspėjimo, galimi paslaugų tiekėjo, operatoriaus ar paciento sužalojimai dėl elektros šoko, mechaninių ar kitų pavojų. |
| ADVARSEL (NO) | <p>Denne servicehåndboken finnes bare på engelsk.</p> <ul style="list-style-type: none"> Hvis kundens serviceleverandør har bruk for et annet språk, er det kundens ansvar å sørge for oversettelse. Ikke forsøk å reparere utstyret uten at denne servicehåndboken er lest og forstått. Manglende hensyn til denne advarselen kan føre til at serviceleverandøren, operatøren eller pasienten skades på grunn av elektrisk støt, mekaniske eller andre farer. |
| OSTRZEŻENIE (PL) | <p>Niniejszy podręcznik serwisowy dostępny jest jedynie w języku angielskim.</p> <ul style="list-style-type: none"> Jeśli serwisant klienta wymaga języka innego niż angielski, zapewnienie usługi tłumaczenia jest obowiązkiem klienta. Nie próbować serwisować urządzenia bez zapoznania się z niniejszym podręcznikiem serwisowym i zrozumienia go. Niezastosowanie się do tego ostrzeżenia może doprowadzić do obrażeń serwisanta, operatora lub pacjenta w wyniku porażenia prądem elektrycznym, zagrożenia mechanicznego bądź innego. |
| ATENÇÃO (PT-BR) | <p>Este manual de assistência técnica encontra-se disponível unicamente em inglês.</p> <ul style="list-style-type: none"> Se outro serviço de assistência técnica solicitar a tradução deste manual, caberá ao cliente fornecer os serviços de tradução. Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica. A não observância deste aviso pode ocasionar ferimentos no técnico, operador ou paciente decorrentes de choques elétricos, mecânicos ou outros. |

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| <p>ATENÇÃO (PT-PT)</p> | <p>Este manual de assistência técnica só se encontra disponível em inglês.</p> <ul style="list-style-type: none"> • Se qualquer outro serviço de assistência técnica solicitar este manual noutra língua, é da responsabilidade do cliente fornecer os serviços de tradução. • Não tente reparar o equipamento sem ter consultado e compreendido este manual de assistência técnica. • O não cumprimento deste aviso pode colocar em perigo a segurança do técnico, do operador ou do paciente devido a choques eléctricos, mecânicos ou outros. |
| <p>ATENȚIE (RO)</p> | <p>Acest manual de service este disponibil doar în limba engleză.</p> <ul style="list-style-type: none"> • Dacă un furnizor de servicii pentru clienți necesită o altă limbă decât cea engleză, este de datoria clientului să furnizeze o traducere. • Nu încercați să reparați echipamentul decât ulterior consultării și înțelegerii acestui manual de service. • Ignorarea acestui avertisment ar putea duce la rănirea depănatorului, operatorului sau pacientului în urma pericolelor de electrocutare, mecanice sau de altă natură. |
| <p>ОСТОРОЖНО! (RU)</p> | <p>Данное руководство по техническому обслуживанию представлено только на английском языке.</p> <ul style="list-style-type: none"> • Если сервисному персоналу клиента необходимо руководство не на английском, а на каком-то другом языке, клиенту следует самостоятельно обеспечить перевод. • Перед техническим обслуживанием оборудования обязательно обратитесь к данному руководству и поймите изложенные в нем сведения. • Несоблюдение требований данного предупреждения может привести к тому, что специалист по техобслуживанию, оператор или пациент получит удар электрическим током, механическую травму или другое повреждение. |
| <p>UPOZORENJE (SR)</p> | <p>Ovo servisno uputstvo je dostupno samo na engleskom jeziku.</p> <ul style="list-style-type: none"> • Ako klijentov serviser zahteva neki drugi jezik, klijent je dužan da obezbedi prevodilačke usluge. • Ne pokušavajte da opravite uređaj ako niste pročitali i razumeli ovo servisno uputstvo. • Ne pokušavajte da opravite uređaj ako niste pročitali i razumeli ovo servisno uputstvo. |
| <p>UPOZORNENIE (SK)</p> | <p>Tento návod na obsluhu je k dispozícii len v angličtine.</p> <ul style="list-style-type: none"> • Ak zákazníkovi poskytovateľ služieb vyžaduje iný jazyk ako angličtinu, poskytnutie prekladateľských služieb je zodpovednosťou zákazníka. • Nepokúšajte sa o obsluhu zariadenia, kým si neprečítate návod na obsluhu a neporozumiete mu. • Zanedbanie tohto upozornenia môže spôsobiť zranenie poskytovateľa služieb, obsluhujúcej osoby alebo pacienta elektrickým prúdom, mechanické alebo iné ohrozenie. |

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| ATENCION (ES) | <p>Este manual de servicio sólo existe en inglés.</p> <ul style="list-style-type: none"> • Si el encargado de mantenimiento de un cliente necesita un idioma que no sea el inglés, el cliente deberá encargarse de la traducción del manual. • No se deberá dar servicio técnico al equipo, sin haber consultado y comprendido este manual de servicio. • La no observancia del presente aviso puede dar lugar a que el proveedor de servicios, el operador o el paciente sufran lesiones provocadas por causas eléctricas, mecánicas o de otra naturaleza. |
| VARNING (SV) | <p>Den här servicehandboken finns bara tillgänglig på engelska.</p> <ul style="list-style-type: none"> • Om en kunds servicetekniker har behov av ett annat språk än engelska, ansvarar kunden för att tillhandahålla översättningstjänster. • Försök inte utföra service på utrustningen om du inte har läst och förstår den här servicehandboken. • Om du inte tar hänsyn till den här varningen kan det resultera i skador på serviceteknikern, operatören eller patienten till följd av elektriska stötar, mekaniska faror eller andra faror. |
| OPOZORILO (SL) | <p>Ta servisni priročnik je na voljo samo v angleškem jeziku.</p> <ul style="list-style-type: none"> • Če ponudnik storitve stranke potrebuje priročnik v drugem jeziku, mora stranka zagotoviti prevod. • Ne poskušajte servisirati opreme, če tega priročnika niste v celoti prebrali in razumeli. • Če tega opozorila ne upoštevate, se lahko zaradi električnega udara, mehanskih ali drugih nevarnosti poškoduje ponudnik storitev, operater ali bolnik. |
| DİKKAT (TR) | <p>Bu servis kılavuzunun sadece ingilizcesi mevcuttur.</p> <ul style="list-style-type: none"> • Eğer müşteri teknisyeni bu kılavuzu ingilizce dışında bir başka lisandan talep ederse, bunu tercüme ettirmek müşteriye düşer. • Servis kılavuzunu okuyup anlamadan ekipmanlara müdahale etmeyiniz. • Bu uyarıya uyulmaması, elektrik, mekanik veya diğer tehlikelerden dolayı teknisyen, operatör veya hastanın yaralanmasına yol açabilir. |

DAMAGE IN TRANSPORTATION

All packages should be closely examined at time of delivery. If damage is apparent, have notation "Damage in Shipment" written on all copies of the freight or express bill before delivery is accepted or "signed for" by a General Electric representative or a hospital receiving agent. Whether noted or concealed, damage **MUST** be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14-day period.

To file a report:

- Call 1-800-548-3366 and use option 8.
- Fill out a report on <http://egems.med.ge.com/edq/home.jsp>
- Contact your local service coordinator for more information on this process.

Rev. June 13, 2006

CERTIFIED ELECTRICAL CONTRACTOR STATEMENT

All electrical Installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. In addition, electrical feeds into the Power Distribution Unit shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE Medical personnel. The products involved (and the accompanying electrical installations) are highly sophisticated, and special engineering competence is required. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE's electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE's field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

IMPORTANT...X-RAY PROTECTION

X-ray equipment, if not properly used, may cause injury. Accordingly, the instructions herein contained should be thoroughly read and understood by everyone who will use the equipment before you attempt to place this equipment in operation. The General Electric Company, GE Healthcare Group, will be glad to assist and cooperate in placing this equipment in use.

Although this apparatus incorporates a high degree of protection against x-radiation other than the useful beam, no practical design of equipment can provide complete protection. Nor can any practical design compel the operator to take adequate precautions to prevent the possibility of any persons carelessly exposing themselves or others to radiation.

It is important that anyone having anything to do with x-radiation be properly trained and fully acquainted with the recommendations of the National Council on Radiation Protection and Measurements as published in NCRP Reports available from NCRP Publications, 7910 Woodmont Avenue, Room 1016, Bethesda, Maryland 20814, and of the International Commission on Radiation Protection, and take adequate steps to protect against injury.

The equipment is sold with the understanding that the General Electric Company, GE Healthcare Group, its agents, and representatives have no responsibility for injury or damage which may result from improper use of the equipment.

Various protective materials and devices are available. It is urged that such materials or devices be used.

IMPORTANT...RADIOACTIVE MATERIAL HANDLING

Only employees formally trained in radioactive materials handling and this equipment are authorized by the GE Healthcare Radiation Safety Officer to use radioactive materials to service this equipment.

GE Healthcare is required to notify the applicable U.S. state agency PRIOR to any source service event involving pin source handling. See NUC/PET radioactive material guides for specific instruction or contact your EHS Specialist.

A radiation survey must be performed when a pin source has been removed and replaced. See Radiation Survey Form Instructions or contact your EHS Specialist.

Rev 2 (July 21, 2005)

LITHIUM BATTERY CAUTIONARY STATEMENTS**CAUTION**

Risk of Explosion.

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

ATTENTION

Danger d'Explosion

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

OMISSIONS & ERRORS

Customers, please contact your GE Sales or Service representatives. GE personnel, please use the GE Healthcare PQR Process to report all omissions, errors, and defects in this publication.

Revision History

| Rev | Date | Reason for change |
|-----|----------------|---|
| 2 | April 09, 2014 | Chapter 2: Updated Table 2-3 system interconnect cables information Chapter 4: Updated Figure 4-5 Gantry Base Cover Installed Chapter 8: Added Section 4.0 and Section 5.0 option installation |
| 1 | Dec 20, 2013 | Initial release for KL64 Saturn MV |

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Preface

Publication Conventions

Please become familiar with the conventions used within this publication before proceeding.

Section 1.0

Safety & Hazard Information




1.1 Text and Character Representation


Within this publication, different paragraph and character styles have been used to indicated potential hazards. Paragraph prefixes, such as hazard, caution, danger and warning, are used to identify important safety information. Text (Hazard) styles are applied to the paragraph contents that is applicable to each specific safety statement. Words describe the type of potential hazard that may be encountered and are placed immediately before the paragraph it modifies. Safety information will normally include:

- Type of potential hazard
- Nature of potential injury
- Causative condition
- How to avoid or correct the causative condition


EXAMPLES OF HAZARD STATEMENTS USED

A few examples are provided below. They include paragraph prefixes and modified text styles.

| | |
|--|---|
|  CAUTION Pinch Points Loss of Data Sharp Objects | <p>Caution is used when a hazard exists that can or <u>could cause minor injury</u> to self or others if instructions are ignored. They include for example:</p> <ul style="list-style-type: none">• Loss of critical patient data• Crush or pinch points• Sharp objects |
|  DANGER EXCESSIVE VOLTAGE CRUSH POINT | <p>DANGER IS USED WHEN A HAZARD EXISTS THAT <u>WILL CAUSE SEVERE PERSONAL INJURY</u> OR DEATH IF INSTRUCTIONS ARE IGNORED. THEY CAN INCLUDE:</p> <ul style="list-style-type: none">• ELECTROCUTION• CRUSHING• RADIATION |
|  WARNING ROTATING EQUIPMENT BARE WIRES | <p>WARNING IS USED WHEN A HAZARD EXISTS WHICH <u>COULD</u> OR CAN <u>CAUSE SERIOUS PERSONAL INJURY</u> OR DEATH IF INSTRUCTIONS ARE IGNORED. THEY CAN INCLUDE:</p> <ul style="list-style-type: none">• Potential for shock• Exposed wires• Failure to Tag and lockout system power could allow for un-command motion. |

-  **NOTICE**
Equipment Damage Possible
- Notice is used when a hazard is present that can cause property damage but has absolutely no personal injury risk. They can include:**
- Disk drive will crash
 - Internal mechanical damage, such as to the x-ray tube
 - Coasting the rotor through resonance.
- It's important that the reader not ignore hazard statements in this document.

1.2 Graphical Representation

Important information will always be preceded by the exclamation point  contained within a triangle, as seen throughout this chapter. In addition to text, several different graphical icons (symbols) may be used to make you aware of specific types of hazards that could possibly cause harm.

ELECTRICAL



LASER



MECHANICAL



HEAT



RADIATION



PINCH



Some others make you aware of specific procedures that should be followed.

AVOID STATIC ELECTRICITY



TAG AND LOCK OUT



WEAR EYE PROTECTION



Section 2.0 Publication Conventions

2.1 General Paragraph and Character Styles

Prefixes are used to highlight important non-safety related information. Paragraph prefixes (such as Purpose, Example, Comment and Note) are used to identify important but non-safety related information. Text styles are also applied to text within each paragraph modified by the specific prefix.

EXAMPLES OF PREFIXES USED FOR GENERAL INFORMATION

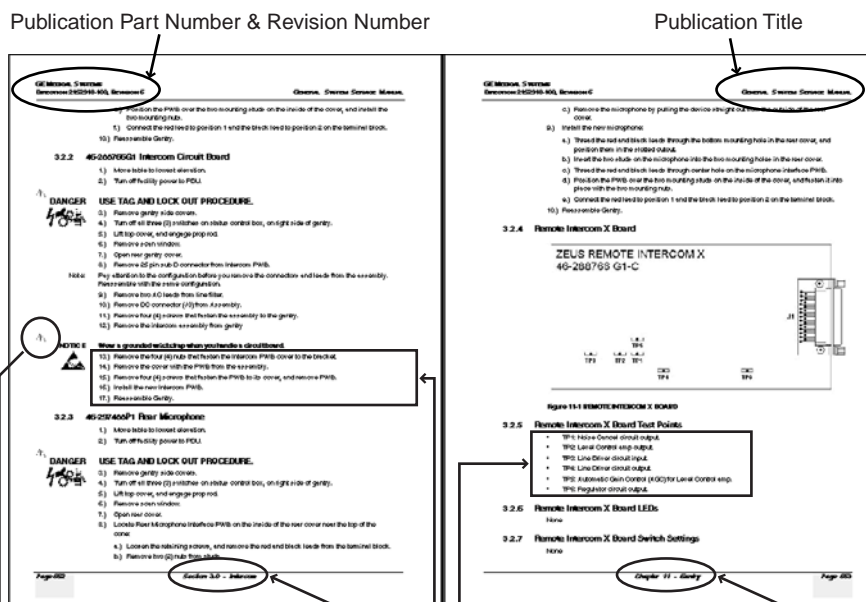
Purpose: Introduces and provides meaning as to the information contained within the chapter, section or subsection, such as used at the beginning this chapter for example.

Note: Conveys information that should be considered important to the reader.

Example: Used to make the reader aware that the paragraph(s) that follow are examples of information possibly stated previously.

Comment: Represents "additional" information that may or may not be relevant.

2.2 Page Layout



The current section and its title are always shown in the footer of the left (even) page.

An exclamation point in a triangle is used to indicate important information to the user.

Paragraphs preceded by Alphanumeric (e.g. numbers) characters is information that must be followed in a specific order.

The current chapter and its title are always shown in the footer of the right (odd) page.

Paragraphs preceded by symbols is (e.g. bullets) is information that has no specific order.

Headers and footers in this publication are designed to allow you to quickly identify your location. The document's part number and revision number appears in every header on every page. Odd numbered page footers indicate the current chapter, its title, and current page number. Even page footers show the current section and its title, as well current page number.

2.3 Computer Screen Output/Input Character Styles

Within this publication different character styles are used to indicate computer input and output text. Character (input, output, and variable) styles are used and applied to the text within a paragraph so as to indicate directions. Computer screen output and input is also formatted using mono (fixed width) spaced fonts.

Example: This paragraph denotes computer screen fixed output. It's output is fixed from the sense that it does not vary from application to application. It's the most commonly used style used to indicate filenames, paths, and text.
Fixed Output

Example: *This paragraph denotes computer screen output that is variable. Its output varies from application to application. Variable output is sometimes found placed between greater than and lesser than operators. For example: <variable_ouput>*
Variable Output

Example: **This paragraph denotes fixed input. It's typed input that will not vary from application to application. Fixed text the user is required to supply as input.**
Fixed Input

Example: ***This paragraph denotes computer input that can vary from application to application. Variable text the user is required to supply as input. Variable input sometimes is placed between greater than and lesser than operators. For example: <variable_input>. In these cases, the (<>) operators are dropped prior to input. Exceptions are noted in the text.***
Variable Input

2.4 Buttons, Switches and Keyboard Inputs (Hard & Soft Keys)

Different character styles are used to indicate actions requiring the reader to press either a hard or soft button, switch, or key. Physical hardware, such as buttons and switches, are called hard keys because they are hard wired or mechanical in nature. A keyboard or on/off switch would be a hard key. Software or computer generated buttons are called soft keys because they are software generated. Software driven menu buttons are an example of such keys. Soft and hard keys are represented differently in this publication.

Example: A power switch **ON/OFF** or a keyboard key like **ENTER** is indicated by applying a character style that uses both over and under-lined bold text that is bold. This is a hard key.
Hard Keys

Example: Whereas the computer **MENU** button that you would click with your mouse or touch with your hand uses over and under-lined regular text. This is a soft key.
Soft Keys

Chapter 1

Position Subsystems



NOTICE

- Record data collected from procedures in this chapter into Form 4879 when directed.
- Only use the installation manual that arrives with your system. Any other revisions of this manual may not exactly match your system.

Section 1.0 Installer/FE Notices

1.1 General Safety Guidelines

- 1.) Follow all safety precautions, warnings and instructions in this manual.
- 2.) Read and obey the warning and instructions on equipment labels or tags.
- 3.) Allow only qualified personnel to install, maintain and service this equipment.
- 4.) While the system is designed to meet all safety requirements applicable to medical equipment, qualified operators must understand the potential safety hazards, and take steps to minimize the risk at all times.
- 5.) Never modify the system in whole or part without prior written approval by GE Healthcare.
- 6.) Do not change, add or remove any system accessory without prior written approval of the vendors local service manager.
- 7.) Never leave the system in an unsafe condition. Notify the customer that the system is not to be used until a problem is resolved.
- 8.) Read and follow the precautions described in this manual.

1.2 Shipping, Warehouse and Transportation Warning

This gantry should be moved using the shipping dollies only. Do not lift or move it using a lift truck under the gantry frame.

1.3 International Shipments

- Use dollies to remove the gantry from the shipping skid and to transport the gantry to the customer's site.
- If lifting is required, instructions are in the *Pre-Installation Manual* for this system.

1.4 On Site Warning

This system requires a gantry bearing gap inspection *before* electrical calibration is started.

1.5 Service Actions

If the bearing inspection fails the FE opens a dispatch and does not continue with the electrical calibration procedures.

Section 2.0

Introduction

This chapter describes how to mount, position, and level the CT Scanner subsystems.

Note: Before you start the installation, make sure the site preparation complies with conditions and instructions found in the *Pre-installation Manual* for this system. Failure to comply results in excessive installation delay and potential increased, unrecoverable installation costs. This product is designed to meet specific mechanical installation standards that should be reviewed prior to installing this system.

2.1 Overview

Note: Installation paperwork is required for all installations.

Procedures in this chapter provide detailed instructions to position, level, and anchor the gantry and table securely for operation. The system uses adjustable leveling pads to support the gantry and table. The gantry has four (4) primary leveling pads located on the gantry base. The table has four (4) pads used for leveling it.

The process you follow is:

- 1.) Use the room-layout template to determine the general position of the gantry and table.
- 2.) Move the gantry into position.
- 3.) Level gantry.
- 4.) Use the laser tool to position the table relative to the gantry.
- 5.) Level the table to the gantry, and anchor the system.
- 6.) Complete the mechanical installation section of GE Form e4879.

Note: Use the template to position the system. Use the gantry and table to locate and drill the anchor holes. Drill the anchor holes with the system in place. Refer to [Section 5.0, on page 39](#) for an example of this procedure. This CT system installation procedure requires the items listed in [Section 2.3, on page 27](#).

2.2 Pre-Installation Template

Always use the room layout template (two pieces), during installation. The gantry and table are not properly aligned if existing holes are used. The template shows the location of the gantry and table anchor holes.

The applicable template is shipped with the system. It is located on the middle shelf on the Lean Installation Cart. You can also order it via the web GEMS BUY, from Coakley-Tech.

Room Layout Template:

- **For the system with GT1700V: P/N 5341997-2**
- **For the system with Lite Table: P/N 5193991**

2.3 Required Common Tools and Supplies

The following tools and supplies should be included in the standard CT installation tool kit. The tools listed represent the minimum tools required for installing this CT scanner.

Wrenches

- Standard and metric combination wrench sets
- Standard and metric hex key (Allen wrench) sets
- ½ in. and 3/8 in. (9.5mm), drive torque wrench: 0-100 N-m (0-100 ft.-lb.) Must be calibrated yearly.

Sockets and Extensions

- 3/8 in. drive metric and standard socket set
- 1 in, 1-1/8 in, 1-¼ in, 1-½ in, 1-5/8 in sockets
- ½ in. drive ratchet wrenches
- ¾ in. deep well socket
- Metric hex bit set ¼ in. or 3/8 in. drive, including 10 mm and 14 mm hex bit
- 3/8 in. drive universal joint
- 21mm socket (optional)

Screw Drivers

- Torque Screwdriver
- Phillips screwdriver set (small, medium, and large)
- Straight blade screwdriver set (small, medium, and large)
- Pozi-drive 0 (S)
- Pozi-drive #1
- Hex bit set with: Flat blade bit, Plus blade bit, Hex bits, and Star bits.

Drill Bits

- Complete set of standard (U.S.) drill bits
- Metric tap set (Optional)
- ½ in. masonry bit, min. 10 in. long USA; 12 in. optional (Bit must not be metric.)
- 4" (100mm) hole saw with 1/8" (5mm) masonry bit (to remove flooring)

Power Tools

- 3/8 in. or ½ in. drill, cordless or electric
- Reciprocating saw (Sawzall or equivalent) and assorted blades
- Hammer Drill & Bit (8 in. min, 12 in. max)
- Sears shop vacuum or equivalent, with HEPA or drywall dust filter
- 25 ft. extension power cords

Electrical Tools

- DVM capable of reading 0.5 ohms or less
- Continuity Tester
- FE Electronic Monitor Static Kit or equivalent static mat kit with ground wrist strap (P/N 2220482)
- Dale 600 or 601 Leakage meter or equivalent
- Temperature/humidity tool: Oregon Scientific Wireless Weather Station Model BAR608HGA or equivalent

Hand Tools

- Ball-peen hammer (1 lb. or 2 lb.)
- Tongue & groove pliers (large)
- Diagonal cutting pliers, large (to cut 1/0 ground)
- Diagonal cutting pliers, small and large
- Large pry bar 460 mm . 600 mm (18 in. - 24 in.)

Recommended Levels

- Johnson Magnetic Level, model 7500M -- 225 mm (9 in.)
- Johnson Professional Box Beam Level, model 9624 -- 600 mm (24 in.)
- Digital level with accuracy of $\pm 0.1^\circ$ -- 225 mm (9 in.)
- Johnson Professional Box Beam Level -- 1225 mm (48 in.) (Optional)

Personal Safety Equipment

- Safety shoes*
- Safety glasses*
- Hand Protection (Leather is required when performing duct work.)
- Knee pads or kneeling pad
- LOTO kit -- MUST have tags and appropriate lock(s)
- Hearing protection
- 2 m (6 ft.) or 4 m (8 ft.) step ladders or equivalent

• Face Shield

* Required items

System Cleaners

Purchase Locally:

- Alcohol
- 10% Bleach
- *Scrubbing Bubbles* bathroom cleaner or equivalent
- Sani-cloth HB
- Incidin Plus
- TriGreene

Other

Purchase locally (available at office supply stores): a China marker or wax marking pencil or equivalent, any color that is visible on the floor where the system is being installed. Permanent markers are often used if the lines will be covered by the product.

GE Tools

- System Alignment Kit (p/n 5148193 or p/n 5272090)
(This tool may not be available via the tool pool in some areas.)

Section 3.0 Delivery Procedure

3.1 System Transportation - Temperature Extremes

When transporting the CT system, ensure that the system is not exposed to temperatures or humidity outside the following specifications.

Temperature: 0° to +120° F (-18° to +49° C)

Humidity: 20% to 80%

NOTICE **Component Freezing occurs if CT system is exposed to temperatures below 0° F (-18° C) for a period longer than two days.**

Allow a minimum of 12 hours for the CT system to adjust to ambient room temperature prior to installation.

Inspect for visible condensation and allow all moisture to evaporate before starting the installation.

3.2 Stored Systems

If your system was stored for more than three months:

- Complete a visual inspection, looking for damage due to improper storage.
- Check for the latest software revisions, options, and component changes.
- Contact the OLC for support.
- Movers are required to move the equipment to the scan room.

3.3 Construction Site Storage

When storing the CT system at a construction site, be sure to adhere to the following storage requirements:

- Construction site packaging must be ordered and the system shipped packaged for storage.
- Do not damage or puncture the shipping crate.
- Do not remove packaging until the completion of all construction at the site and the removal of all dust created by the construction.
- Maintain a storage temperature within the range of 10° to 32° C (50° to 90° F).
- Maintain a relative humidity (non-condensing) between 20% and 70%.

3.4 Construction Site Installations

A construction installation describes installations at sites without an occupancy permit, or ongoing construction. In general, construction sites fail to meet the required specifications for system delivery, and GE Healthcare does not recommend such installations, as they can result in delays, increased costs, and possible damage to the system. When construction-site delivery proves unavoidable, the installation falls into one of two categories:

- Full construction site with completed radiology area.
- Full construction site with limited delivery access.

Review these categories to determine which most closely matches the condition of the planned installation site.

3.4.1 Construction Site with Completed Radiology Area

This type of site consists of a finished, dust-free, occupancy-ready radiology suite at a site with ongoing construction in other areas, but with no remaining construction in or around the scan suite area. At the time of delivery such sites feature:

- Dust control measures deployed in the radiology suite area.
- Scan suite access limited to a single entrance.
- Radiology suite sealed off from the remaining construction area.
- Operational HVAC, with a positive air pressure within the radiology suite.

In addition, the radiology suite at such a site REMAINS in a dust-free, occupancy-ready state after delivery and throughout the remaining construction phase.

For more details, refer to the *Pre-Installation Manual*.

3.4.2 Full Construction Site with Limited Delivery Access

This type of site allows delivery during ongoing construction of the radiology suite area.

Construction site packaging must be ordered and the system is delivered packed for construction site storage. Packaging cannot be added during the delivery.

At Full Construction sites, delivery occurs prior to site completion, but the product remains stored until the completion of a finished, dust-free, occupancy-ready radiology suite area. This system is delivered in sealed packages with dollies. Delivery to the storage area requires a lift truck or riggers. Installation work can begin **only** when the site reaches the completed, dust-free, occupancy-ready radiology suite requirement.

3.4.3 Construction Site Unpacking

If room is not completed, follow escalation process. Pre-installation escalation is the process used to consult CT Engineering, the Design Center, or EHS to resolve pre-installation issues related to siting concerns and requirements.

A typical construction site package consists of 8-12 packages. Each package is plastic-wrapped in dust-free packaging. Each package must be vacuumed to remove construction dust prior to moving components into the CT scan room. This process can add approximately two hours to your installation time.

Typical components are:

- Gantry
- Table
- Console
- PDU
- UPS
- Lean Cover Cart
- Lean Install Cart
- Chair
- Service Cabinet

3.5 Working with the Mover

- System is shipped lean-packed in North America.
- Ensure that the installation lean cart is the first item moved into the room.

3.5.1 Delivery Dolly Options:

- Gantry Mini Dolly - ordered from UMI at <http://www.umi-dollyshop.com>

Follow the instructions provided by your Project Manager of Installation regarding working with equipment movers. Help direct movers as to where to place equipment and which items are needed first.

Movers should move all equipment into the customer's room. Door removal and other site changes to move equipment should be done only as directed by the Project Manager of Installation.

For component sizes and weights, refer to the *Pre-installation Manual* for this system.

Note: Do not place equipment in its final location at this time. Templates must be laid first.

Note: If you have to remove the gantry covers in order to move the gantry into the room, please read the notice statement on [Appendix A Gantry Cover Removal and Dolly Setup, on page 165](#) before removing the gantry covers.

3.5.2 Equipment Delivery Route

Prior to equipment delivery, review the delivery route with the movers. Refer to the Project Manager of Installation for any additional delivery instructions.

3.5.3 Floor Protection

Movers should use floor protection. Most equipment movers can provide floor protection during the equipment delivery. Installers should provide floor protection for the room.

3.5.4 Removing Gantry Dollies and Covers

- Gantry components cannot be removed to reduce the dimensions.
- Zero clearance dollies are available from UMI at <http://www.umi-dollyshop.com>
- Please read the notice statement on [page 168](#) before removing the gantry covers.

3.6 Damage In Transportation

Check for damage to property that may have occurred at the site during delivery, such as damage to floors, door frames or walls. If damage is found, notify the Project Manager of Installation.


All packages should be closely examined at time of delivery. If damage is apparent, have notation "Damage in Shipment" written on all copies of the freight or express bill before delivery is accepted or "signed for" by a General Electric representative or a hospital receiving agent. Whether noted or concealed, damage shall be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14-day period.

To file a report:

- Call 1-800-548-3366 and use option 8.
- Fill out a report on <http://egems.med.ge.com/edq/home.jsp>
- Contact the local service coordinator for more information on this process.

Rev. June 13, 2006

3.7 A1 Breaker



NOTICE

- All sites must have a main disconnect with Lockout/Tagout capability.
- Non GE-supplied breakers must have/provide under-voltage protection. For more information, refer to the *Pre-Installation Manual* for this system.
- A LICENSED ELECTRICIAN shall install and make connections inside the main disconnect.

Lock-out and tag-out the A1 breaker now.

| A1 Breaker | UPS |
|--|--|
| North America(440V or 460-480V) E4502AB | Optional Partial UPS Kit B7999ZA |
| Europe and Asia 4(380-400V or 420V): E4502AC | |

Table 1-1



Figure 1-1 Sample A1 Breaker

3.7.1 Installation Conditions

- 1.) A Final Site Print is required. Contact your PMI for a final site print.

2.) The room size must match the print.
Measure the room size. If it does not match the stated size, and is smaller, then check all clearances. **Service clearances MUST be met to continue.**

3.) A customer Anchoring Plan is required if there is anything other than a 101.6 mm (4 in.) (minimum) concrete floor. GE employees shall only install the anchors supplied with this system.

4.) Complete this section on the GE Form e4879.

5.) Do not start the installation process if the site is under construction:
 - In the room
 - In the scan area
 - In addition, the radiology suite at such a site will REMAIN in a dust-free, occupancy-ready state after delivery and throughout the remaining construction phase.

Section 4.0 Layout the Floor Template

4.1 Time & Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|-----------|--------------|
| 2 (FE or mechanical supplier) | | | |

4.2 Tools and Test Equipment

- Standard Install Tool Kit
- Install Support Kit
- GE Site Print
- Floor Template for your system
- Chalk line
- China marker or wax marking pencil, or equivalent
- Masking Tape, or equivalent
- PPE (hand protection, foot protection, face shield, eye protection, personal dosimeter)
- Alignment Kit Laser

4.3 Safety

CAUTION Potential for Injury.



The gantry presents a variety of mechanical and electrical hazards.

4.4 Floor Preparation

4.4.1 Preparation

The PMI notifies the installation team if any requirements are not met. It is the purchaser's (buyer) responsibility to provide an approved support structure and an approved method of mounting. General Electric is not responsible for any failure of the support structure or method of anchoring.

4.4.2 Flooring

The system has a total floor load of approximately 3000 kg (6600 lbs). A concentrated load of about 2500 kg (5500 lbs), including patient (227 kg (500 lbs)) is found in the table-gantry assembly. For more information, refer to the Pre-installation Manual for this system.

Do not place the scanner on any resilient flooring. Resilient tile or carpeting may slowly yield over a period of time and disturb the alignment of the table to the gantry. Refer to the floor template to determine locations where resilient flooring material should be removed.

Limitations include:

- No part of the floor surface within the table, gantry, or the two interface areas between table and gantry should be higher than the support areas for the table and gantry.

- The floor structure must withstand the occupied weight of table and gantry, as well as the individual contact area loading of these components.
- The method and placement of anchors or through bolts must not reduce the structural strength of the floor. In some circumstances, the final floor may not be installed. Refer to Chapter 8.0 in the *Pre-Installation Manual* for this system.

If you have to remove the gantry covers in order to move the gantry into the room, refer to the cover removal procedure. Please read the notice statement on [Appendix A Gantry Cover Removal and Dolly Setup](#), on page 165 before removing the gantry covers.

4.5 Room Preparation

- Use the GE print developed for your site to establish the room layout. Make sure all the operating and service clearances shown on the print are observed. Record this information on the GE Form e4879.
- Clean the area. The mounting surface must be free of any material that may interfere with the positioning and leveling of the system.
- Measure and determine ISO using the GE Site print. Using a marker, mark ISO on the floor. Use a chalk line to connect the table center line marks on the floor. This is the line on the print that runs down the center of the table through the gantry. Use this as a reference when positioning the table.

4.6 Procedure

- 1.) Lay out the two (2) pieces of the floor template. Start with the table template, then place the gantry template over the top of the table template. Align them per the GE print.
- 2.) Tape the templates together, making sure that the table and gantry center lines are matched. Then tape the template to the floor.
- 3.) Recheck the position of the gantry in the room per the GE print. If everything matches the GE print, continue. If not, realign the templates to match the print.
- 4.) Make sure there are no potential clearance issues. If there are floor obstructions, such as conduits or old anchors, be sure to cut them flush to the floor to prevent the gantry from resting on them. Also, be sure there is at least 102 mm (4 in.) of clearance between any existing floor penetration and the new gantry position.

Note: There must be clear space without obstructions in order to:

- Change major components, with access to the gantry tube-change (RH) side (See [Figure 1-2](#)).
- Allow space for front and rear cover removal

Note: See Service Clearance Section found in the *Pre-Installation Manual*.



Figure 1-2 Gantry Tube Change Cart

- 5.) Prior to removing this template, check floor levelness, as shown in [Figure 1-3](#).
- 6.) Position the laser from the install kit on the template behind the table base and turn it on to project a horizontal beam across the floor template area.
- 7.) Measure the distance from the floor to the laser line at each bolt hole location on the template and record the measurements. Use the measurements to verify the floor is within specification. The floor must meet the minimum levelness specification: 6 mm (1/4 in.) over 3.5 m (10 ft.) between the table and gantry.

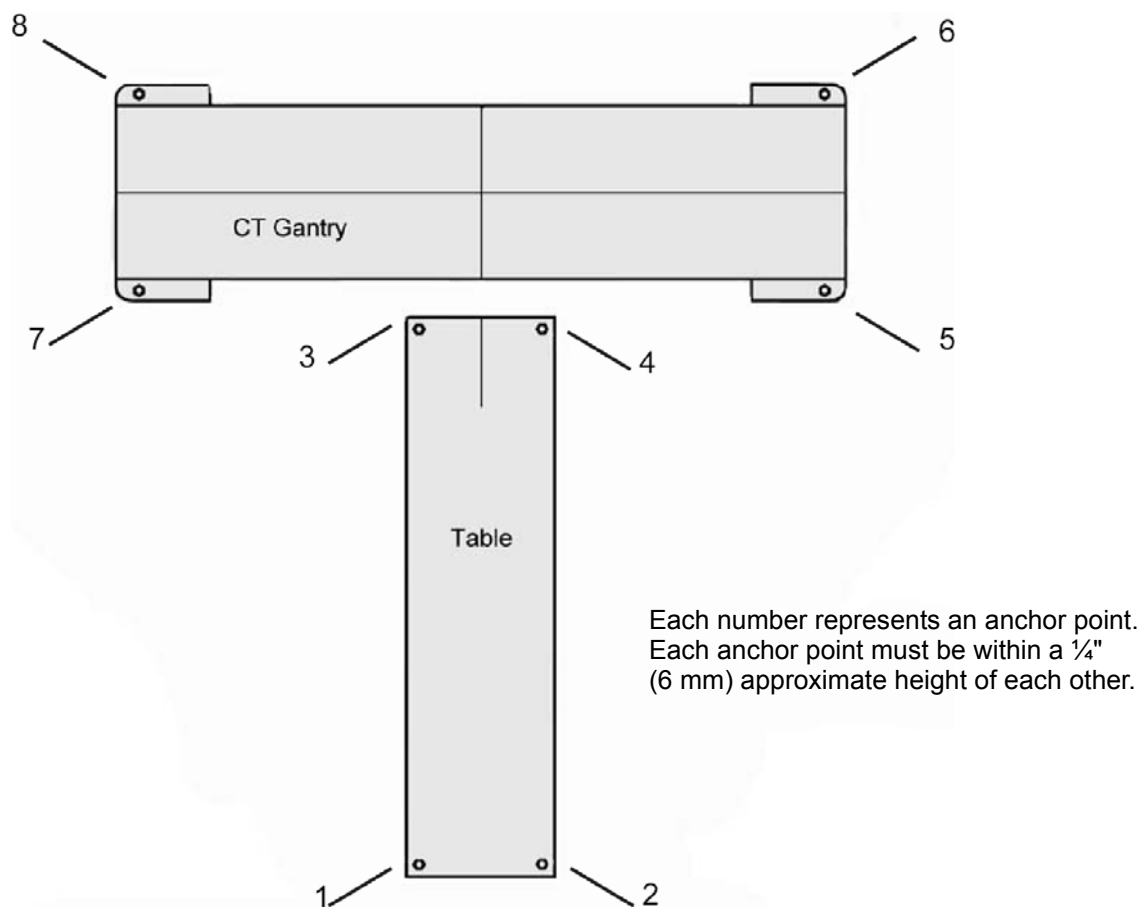


Figure 1-3 Check Floor Level

NOTICE Positioning requires cutting eight (8) holes in the floor covering.

Before you drill or cut any flooring, make sure that you have discussed this issue with the customer, and that the appropriate hospital personnel have approved the location of the table/gantry.

Any repositioning must meet all regulatory requirements to be completed.

- Check that the floor meets the levelness specification. Follow the escalation procedure if the floor does not meet the floor specification.
 - If the floor is not level, the system does not meet the table ISO specification. The distance from the table cradle to the floor cannot be greater than 1005 mm (40 in.).
- 8.) Check with the customer for approval of the gantry/table placement.

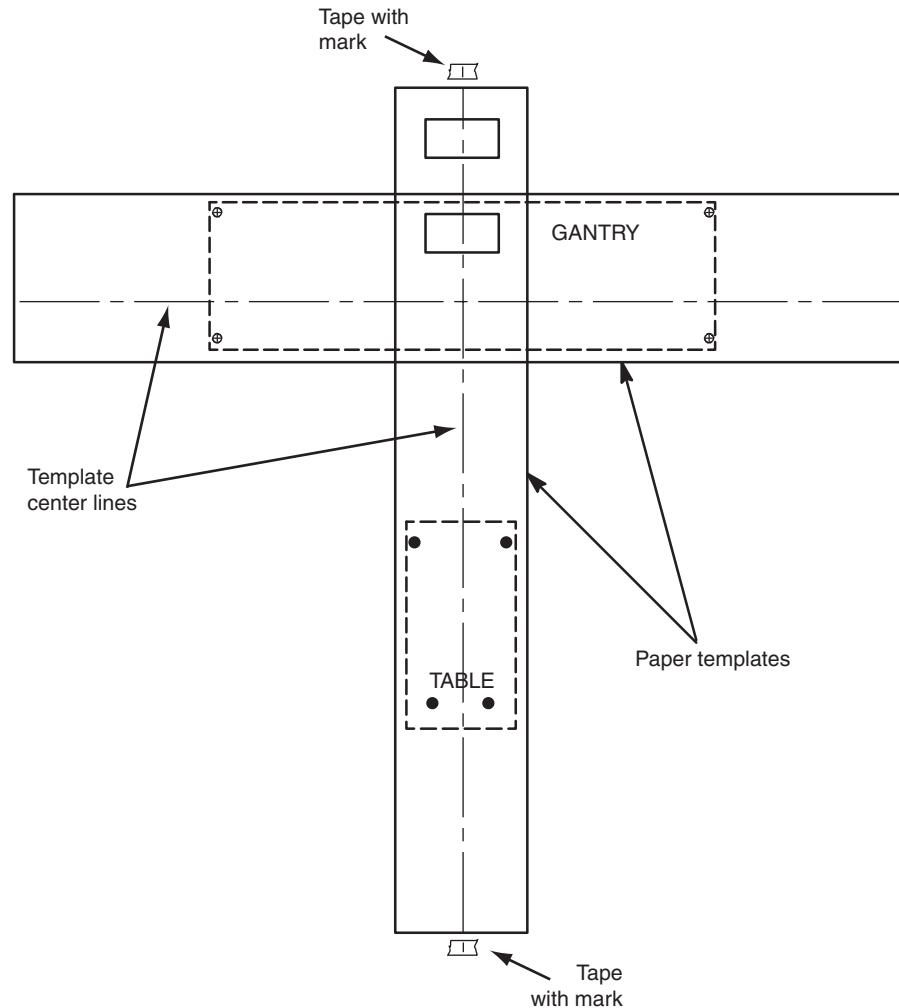


Figure 1-4 Center Line with Marks

- 9.) Use a center punch to mark hole centers for each of the eight (8) leveling pad/anchor locations per [Figure 1-4](#). Before moving on to the next step, see [Step 11](#) and its note for an alternative method.

CAUTION Potential for personal injury.



Use appropriate safety procedures when drilling the floor holes, especially if there is lead under the floor.

Appropriate PPE is required when working with hazardous materials.

- 10.) Remove the floor template.

- 11.) Cut tiles (or other resilient flooring) around all holes punched in the template for the gantry and table.

Note: A fast way to remove flooring is to use a 4 in. hole saw with a 1/4 in. masonry bit to cut through the flooring at each leveler pad location.

- 12.) Some sites require sealing of the floor penetrations after the flooring is removed. If this site does, use RTV or other sealant to seal the floor covering as necessary.

NOTICE **All documentation in this manual is based on mounting the table/gantry on a 102 mm (4 in.) - 110mm (4-1/3 in.) concrete floor.**

- 13.) Snap a chalk line using the marks that were made on the tape at the ends of the table template.

Section 5.0 Install the Gantry

5.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|-----------|--------------|
| 2 (FE or mechanical supplier) | | | |

5.2 Tools and Test Equipment

- Standard Install Tool Kit
- Install Support Kit
- GE Site Print
- Installation Manual
- Gantry Adjuster Tool, P/N 2107863
- Spanner Wrench, P/N 2110003
- PPE (hand protection, foot protection, face shield, eye protection, personal dosimeter)

5.3 Gantry Preparation

Note: Locate and install any required floor protection now.

5.3.1 Access Greater than 28 in.

Remove all the transportation packaging from the gantry, except for the dollies.

5.3.2 Access Less than 28 in.

Measure from the wall or object protruding from the wall to the gantry side cover. The gantry left side cover must be installed for this measurement. When finished, the gantry cannot be closer than 14 in. to the wall or object protruding from the wall.



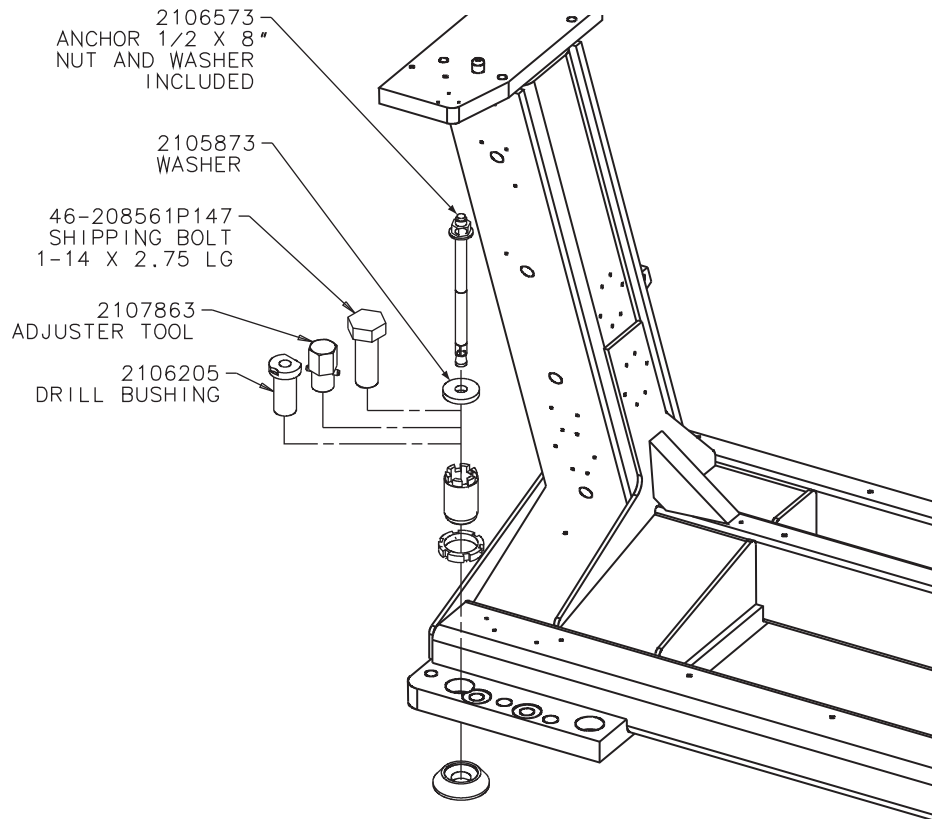
- 1.) Remove all the transportation packaging from the gantry, except for the dollies.
- 2.) Remove the blue dolly from the left side of the gantry and install the limited access dolly so that the gantry can be positioned closer to the left side wall.
 - a.) Remove the three (3) M14 hex bolts that secure the gantry to the dolly.
 - b.) Replace the removed dolly with the shipped black gantry-positioning dolly, and reinstall the three (3) M14 hex bolts.
- c.) Raise the gantry so that it is once again off of the floor.

The gantry can now be moved up to 14 in. from the wall, measured from the wall or object protruding from the wall to the gantry side cover. Only use the supplied, limited-access dolly for this procedure.

Note: If this procedure cannot be completed, follow the site escalation procedure established for your area.

5.4 Procedure

- 1.) Position the gantry over the floor cutouts appropriately.
 - a.) Locate the four (4) leveling pads, and position each of them beneath its associated adjuster.
 - b.) Use the dollies to evenly lower the gantry, until it is just off of the floor (approximately 3/8" or 17.0 mm). Use a 1/2" ratchet to raise and lower the dollies.
 - c.) Carefully rotate the gantry into the correct position over the template.



Note: Adjusters are used at each anchor location. Anchor hole ID is 1" (2.5 cm). Void between adjuster and anchor must be filled according to local building codes for seismic application.

Figure 1-5 Gantry Base Installation Hardware

- 2.) Remove the paper templates from the floor and discard properly.
- 3.) Loosen the locking rings and shipping bolts so you can fine-tune the leveling pads to compensate for slight variations in the floor surface.
- 4.) Position the gantry so that the adjusters are centered over their respective holes scribed earlier into the floor.

IMPORTANT: Make certain to route the gantry power cord under the two rear gantry rails, before removing the gantry shipping dollies.

- 5.) Using a 1/2" ratchet, gently lower the gantry until it rests on the floor, over the marked areas.

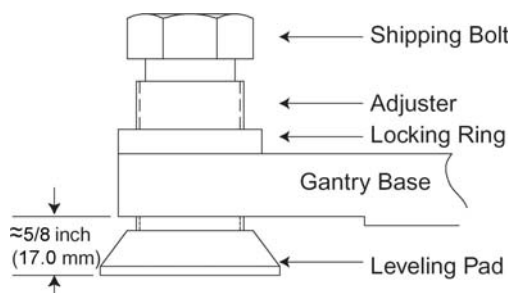


Figure 1-6 Gantry and Table Base Leveling Pads (Starting Positions)

NOTICE



Gantry dollies weigh approximately 250 lbs each. Exercise caution when removing dollies so as to not damage the floor covering.

- 6.) Using a 14mm hex socket, remove the dollies from the gantry by removing the three dolly bolts found at both ends of the gantry ([Figure 1-7](#)).



Figure 1-7 Gantry Dolly Bolts

- 7.) Remove the dolly plates on both sides of the gantry. Retain the dolly plates in the service cabinet at the hospital.



Figure 1-8 Dolly Plate

8.) Remove the four (4) gantry shipping bolts, using a 1½" socket.

46-208561P147
SHIPPING BOLT
1-14 X 2.75 LG

Note: Bolt requires
a 1-½" socket

Note:
Leave this locking ring
off, so that the alignment
bar will fit into the
alignment hole.

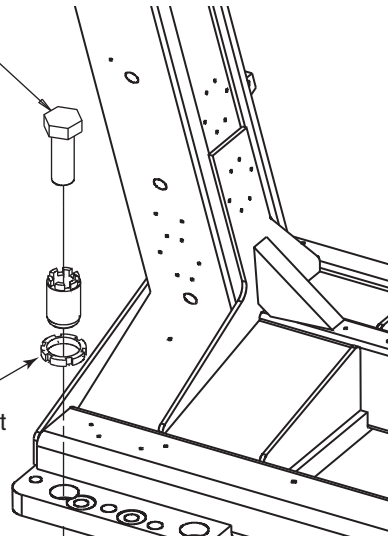


Figure 1-9 Gantry Shipping Bolts

Section 6.0 Level the Gantry

6.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|-----------|--------------|
| 2 (FE or mechanical supplier) | | | |

6.2 Tools and Test Equipment

- Standard Install Tool Kit
- Install Support Kit
- GE Site Print
- Gantry Adjuster Tool, P/N 2107863
- Spanner Wrench, P/N 2110003
- PPE

6.3 Procedure

The gantry uses 2 bubble levels that are permanently mounted to machined surfaces on the stationary base to tell when it is level.

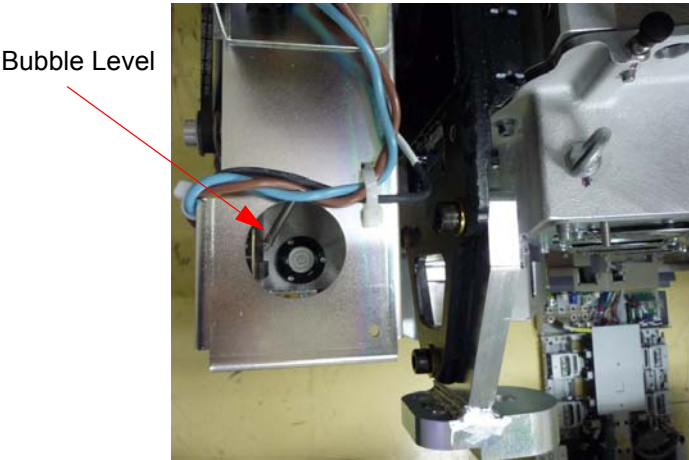


Figure 1-10 Gantry Bubble Level

Bubble levels are located on both ends of the gantry stationary base. They're located on the stationary base near a point where the rotating structure pivots mount to the base structure. (See [Figure 1-10.](#)) The gantry is properly leveled when the bubble is centered. (See [Figure 1-12, on page 45](#)).

- 1.) Loosen all adjuster lock rings (use a spanner wrench or large channel lock pliers).
- 2.) Systematically turn each of the gantry's adjusters (locations 1, 2, 3 and 4 in [Figure 1-11](#)) until both bubble levels are centered left to right and front to back.
 - Begin by turning each adjuster no more than 1 turn at a time.
 - Use the adjuster tool, 1-1/8" socket, and the 1/2" drive ratchet to turn each adjuster. (Refer to [Figure 1-5, on page 40.](#))

Systematic Procedure for Leveling gantry follows:

- a.) Level the left side from front to back by turning adjusters #1 and #2.
- b.) Level the right side from front to back by turning adjusters #3 and #4.
- c.) Level the side (right or left) that is higher with respect to the other side. Turn both adjusters on a side equally until that side is level. The side should now also be level.

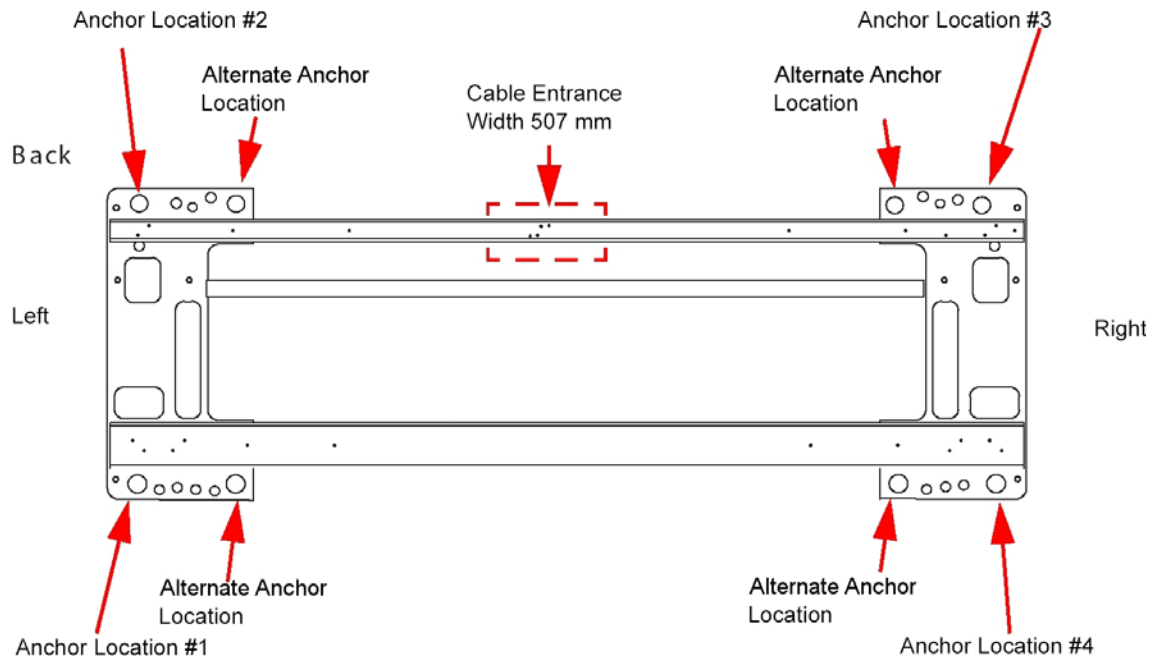


Figure 1-11 Gantry Base "Adjuster" Locations - Top View

- 3.) When the bubble levels are centered ([Figure 1-12](#)), each of the four (4) leveling pads should be carrying a portion of the gantry weight. Distribution of the gantry weight prevents the base frame from rocking during normal operation. **DO NOT leave any adjuster un-loaded or floating.**

Correct level is 100% of bubble within small circle
Incorrect level is less than 100% of bubble within small circle

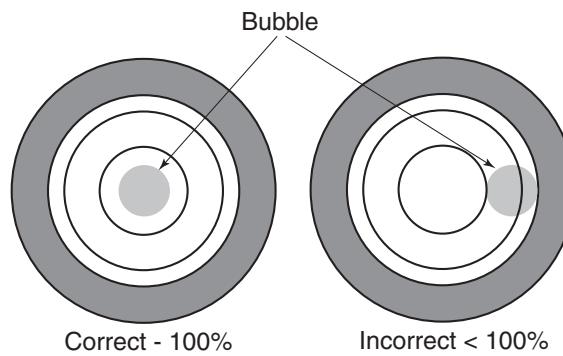


Figure 1-12 Bubble Level Centering

- 4.) Adjust the distance between floor and gantry base at Anchor location #1 becomes approximately 17.0 mm by turning four (4) adjusters equally.
(Be careful no more than 1 turn at a time.)

Section 7.0 Gantry Bearing Gap Inspection

All CT systems require a gantry bearing gap inspection before starting electrical calibration.

All international gantries are shipped in a wooden shipping crate that should not be removed until it arrives at the installation site. This shipping container is designed to reduce the risk of shipping damage.

The back cover needs to be removed to gain access to the gantry bearing.

7.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|-----------|--------------|
| 2 (FE or mechanical supplier) | 15 min | 15 min | 5 min |

7.2 Tools and Test Equipment

- Standard tool kit
- Inspection document
- 2.5 mm Allen wrench
- Rear cover dollies (Qty = 2)
- Flashlight

7.3 Preparation: Damage Indicators

If this is a Rotek bearing, a mark similar to that shown in [Figure 1-13](#) is visible on the inside edge of the black-colored bearing assembly.

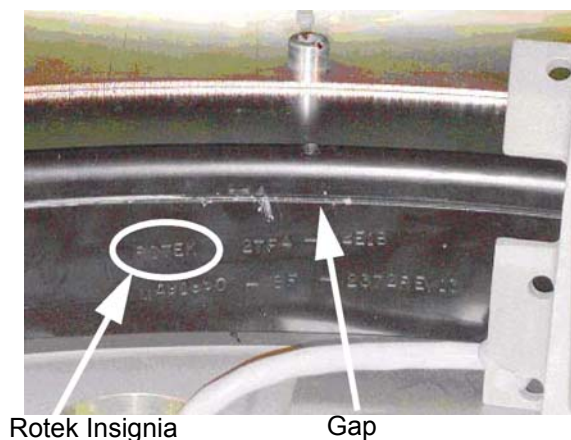
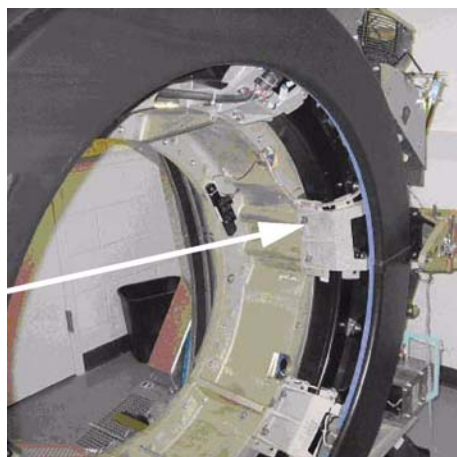


Figure 1-13 Gantry Bearing - Rotek Label

The mark has a serial number in the same format as:

ROTEK 2TF4-44E1B-MA91960-8F-2372-REV13.

The gap to inspect is shown in [Figure 1-14](#) next to the serial number.



Bearing Surface

Figure 1-14 Gantry Bearing

On most systems, a change in the bearing gap does not cause the gantry to make unusual sounds, unless the gap is severe. If the gantry is badly damaged and the gap is severe, it can cause operation issues. Some systems are shipped with shock indicators that must be returned to Milwaukee.

A severe failure may be seen during installation as a problem rotating the gantry.

7.4 Procedure

- 1.) Remove the scan window.
- 2.) Remove the top cover and slide out the rear gantry cover.
- 3.) Slide out gantry bore cover by using the bore cover support tool (Refer to *Replacement > Gantry > Enclosure > Gantry Bore Cover Support Tool Usage* in Service Method CD)

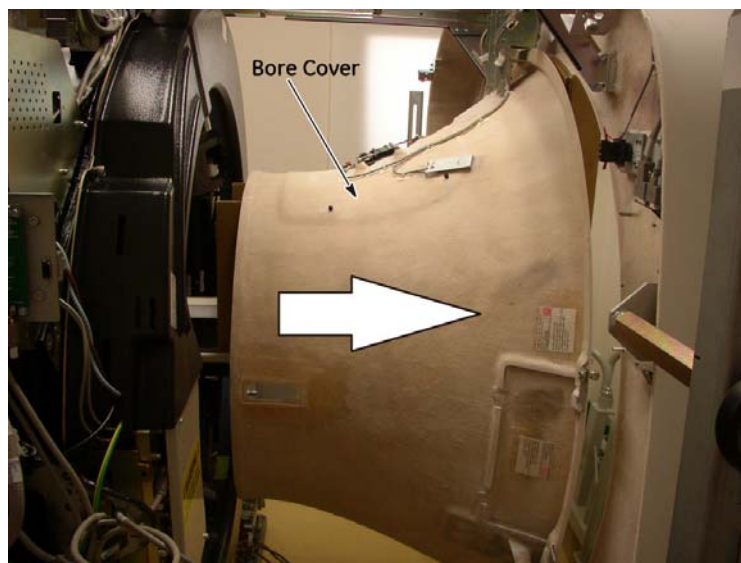


Figure 1-15 Gantry Bore Cover

- 4.) Use a 2.5 mm hex wrench as a tool to measure the gap at the positions shown in [Figure 1-16](#). The location of gantry components does not matter. Measure four (4) locations 90 degrees apart from each other.

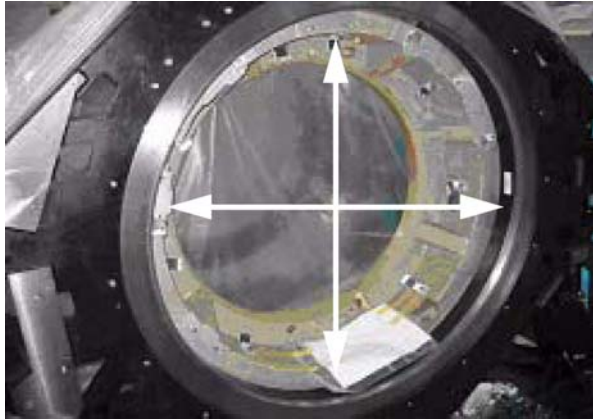


Figure 1-16 Inspection Locations

- 5.) If the 2.5 mm easily fits without effort in the gap, the gap is out of spec. [Figure 1-17](#) shows a gap that is too large in the left picture. [Figure 1-17](#) shows a gap that is good in the right picture. Notice that the hex wrench does not fit in the gap in [Figure 1-17](#) (left picture), but does in [Figure 1-17](#) (right picture).

Note: Do not use force when putting the wrench in the gap. Either it slips in or it doesn't.



Figure 1-17 Gap too large (left)



Gap is good (right)

7.5 Finalization

7.5.1 Mechanical Installers

If the Bearing Gap Inspection passes, complete the sign-off on the GE Form e4879, Installation Data verification form, that this inspection was completed.

If the Bearing Gap Inspection fails, contact your site FE.

7.5.2 FE Service Action, if Required

If the Bearing Gap Inspection fails, the mechanical installer notifies the site FE that the inspection failed.

The site FE should:

- 1.) Open a bearing inspection dispatch.
- 2.) Follow the inspection procedure described in this section.
- 3.) Record the bearing inspection results.

If no damage is found, close this dispatch and continue with the electrical calibration procedures.
If the system is damaged, go to the Equipment Delivery Quality web site and follow their instructions.

To enter a damaged in shipping claim, go to this web site:

<http://egems.med.ge.com/edq/home.jsp>

7.5.3 FE Inspection Completion

1.) After the Gantry Bearing Inspection is complete, close the service dispatch with the following information:

- Gantry Serial Number
- Gantry Type
- System ID
- Site Name
- Installation date
- Was the gantry transported to the site in the shipping crate? (Yes/No)
- Was the gantry lifted or hoisted, were riggers used, or was the gantry delivered via flatbed wrecker? (Yes/No)
- Number of locations that fail the gap inspection if any: _____

2.) Close the service dispatch.

Should any follow-up be required after this inspection, the site engineer will be contacted directly by CT Engineering.

Section 8.0 Install Gantry Alignment Laser and Bracket

8.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|-----------|--------------|
| 2 (FE or mechanical supplier) | | | |

8.2 Tools and Test Equipment

- Standard tool kit
- Laser Alignment kit (p/n 5272090)
- 9" level
- Tape measure
- Masking tape

8.3 Procedure

NOTICE Use caution while removing the gantry scan window.

1.) Rotate the gantry by hand until the collimator face plate is at the 5 o'clock position.

Note: With power OFF, the gantry movement is tight.

DO NOT pin the gantry during this alignment process.

2.) Remove the Gantry side, top, front, and rear covers.

3.) Disconnect two connectors from top of the bore cover.



Figure 1-18 Disconnecting two connectors

- 4.) Remove two (2) bottom bore cover screws and loosen the top bore cover screw.

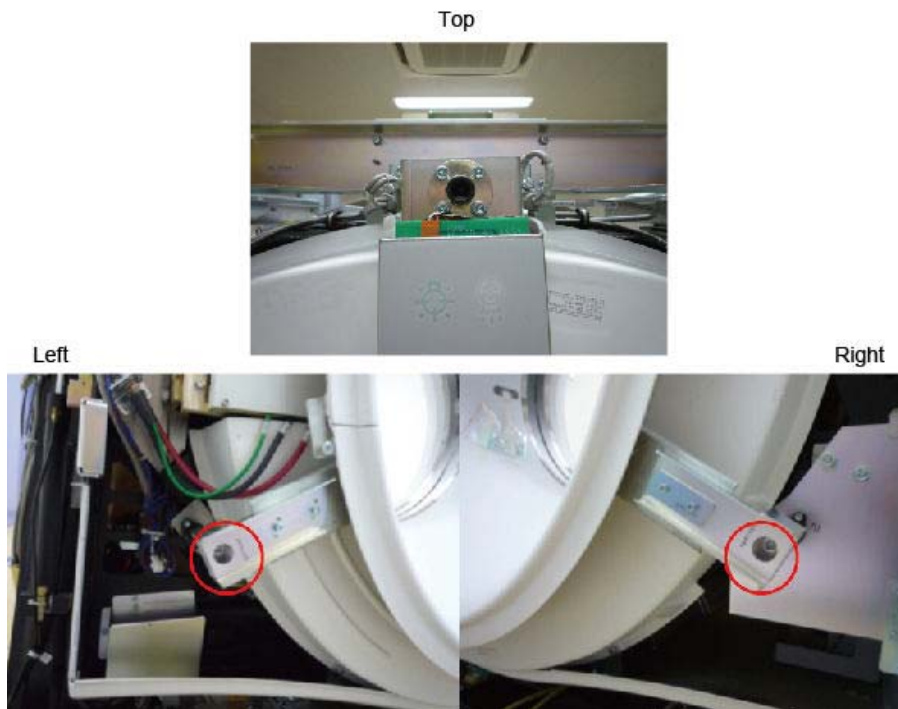


Figure 1-19 Bore Cover Screws

- 5.) Slide the bore cover about 5 cm (2 in.) so that the laser tool can be attached.



Figure 1-20 Sliding Bore cover backward

- 6.) With the Gantry top, rear, and bore covers removed, locate the two M10 bolt holes as shown in [Figure 1-21](#). These bolt holes are used to attach the laser tool to the gantry.
- The bolts can be installed using an 8 mm Allen wrench. Be careful not to bump the alignment light; the mounting space is tight near the alignment light. Tighten bolts until both are snug.

- Do not drop bolts or the bar on the collimator faceplate. Attach the bar as shown in [Figure 1-21](#).
- Using a minimum 223 mm (9 in.) level placed on the attached bar, level the bar by rotating the gantry.

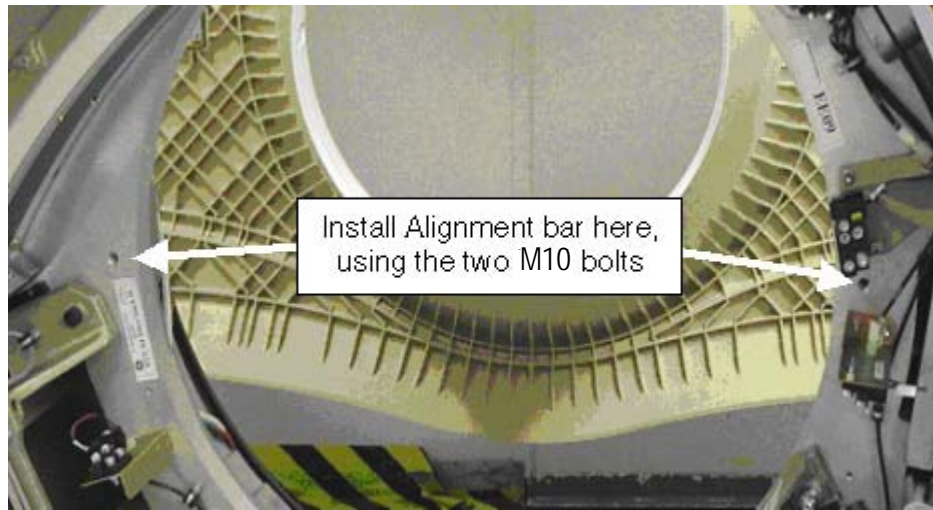


Figure 1-21 Alignment Bar Installation Location

CAUTION



Potential for injury.

DO NOT look into the laser.

Use appropriate safety procedures when working with lasers.

- 7.) Attach the laser centering plate onto the laser mounting bar as shown in [Figure 1-22](#). The plate is attached from under the alignment bar using two fixed locators and two thumb screws.

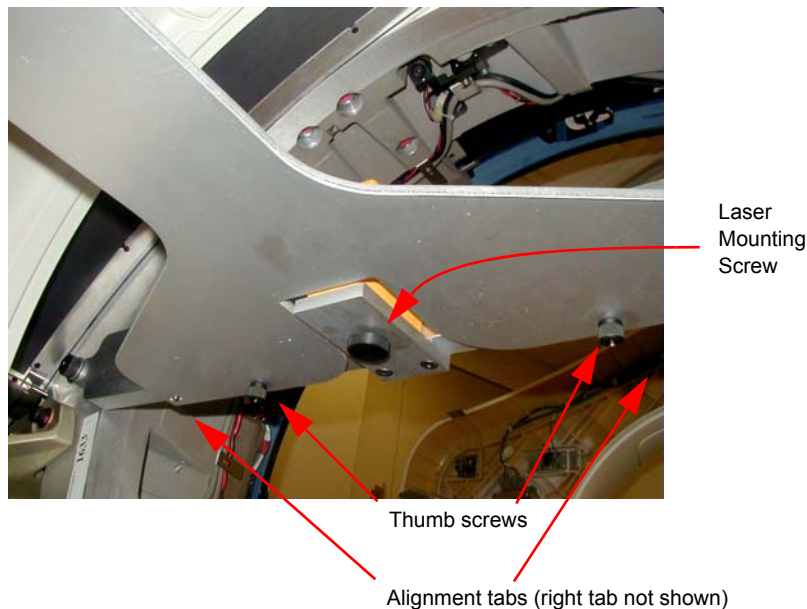


Figure 1-22 Attach Laser Center Plate

- 8.) When done, insert the laser and turn on the laser using the controls on the back. If the laser is loose when mounted, use a 2 in. piece of Velcro loop (fuzzy) section and attach it to the alignment plate over the attachment screw. Remount the laser and it should fit snugly without moving.

- 9.) When pressed, the **ON** button steps through four different beam profiles and "Self-Leveling Off". Press the **ON** button until the "I" beam shows. It is used for this operation.

| Times pressed | Function | Notes |
|---------------|-------------------|------------------|
| 1 | — | |
| 2 | | Self-leveling on |
| 3 | + | |
| 4 | Self-leveling off | Do not use |

Table 1-2 Laser On/Off Button

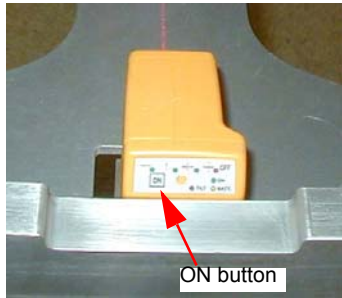


Figure 1-23 Laser ON button

- 10.) Align the laser by carefully rotating the laser base assembly so that the "I" beam shines through the center of the alignment sight mounted on the end of the alignment plate.
- Note: The laser beam may be wider depending on the battery life.
- 11.) Use the locking screw on the bottom of the alignment bar to secure the laser to the bar, as shown in [Figure 1-24](#). When done, the laser should fit snugly without moving on the mounting bracket.

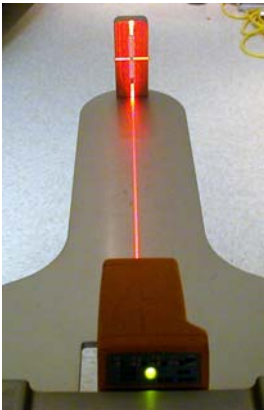


Figure 1-24 Laser Centering

- CAUTION** When tightening, the laser may move. Use caution to prevent any movement, as this can result in drilling the table anchor holes in the wrong location.
- 12.) After the laser is centered, notice that the laser beam also appears on the back wall. Place a piece of masking on the wall and carefully mark a line on the tape where the laser appears. This line is later used in the table alignment. This line is also useful in determining if the laser unit moves during the alignment process.
- 13.) Remove the alignment centering plate and store it in the alignment case.
- 14.) Turn off the laser but do not remove.

Section 9.0 Table Installation (GT1700V)

Note: For Lite Table Installation, refer to [Section 10.0](#).

9.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|-------------------------|--------------|
| 2 (FE or mechanical supplier) | | 1.5 hours labor on-site | |

9.2 Tools and Test Equipment

- Standard Install Tool Kit
- 3/4", 1-1/4", 1-1/2" and 1-5/8" sockets
- 8mm, 10mm, and 14mm hex socket bits
- Laser Alignment kit
- Johnson Professional 6" level
- Johnson Professional 4' level
- Johnson Professional 2' level

9.3 Procedures

9.3.1 Draw Table Reference Lines

- 1.) Draw a reference line of $673 \pm 6 \text{ mm}$ ($26.5" \pm 0.25"$) position from Gantry Base on the floor as shown in the [Figure 1-25](#). This line should be parallel to the gantry. In a later section, you will move the table against the 673 mm (26.5") mark.

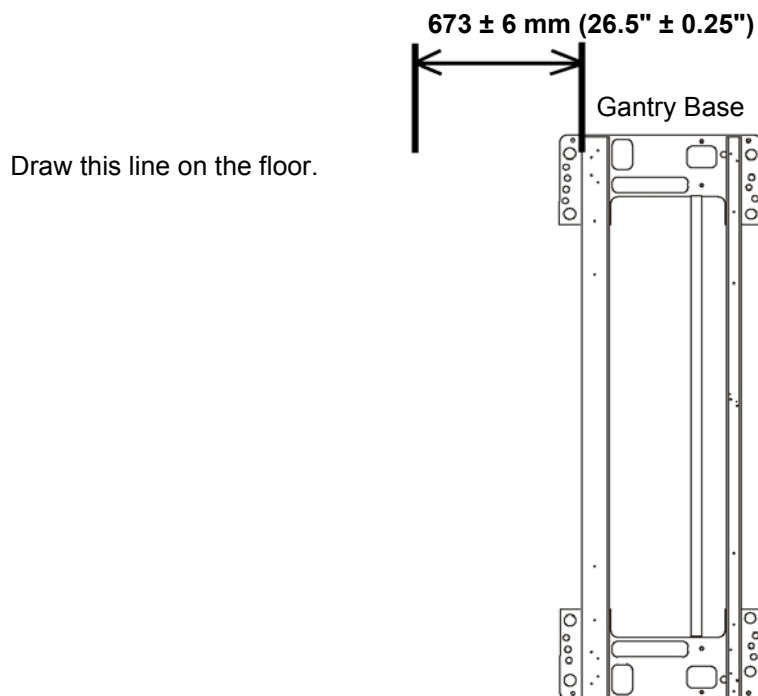


Figure 1-25 Draw Reference Line

- 2.) Using a chalk line, mark a table center line on the floor along the laser light shining on the floor.

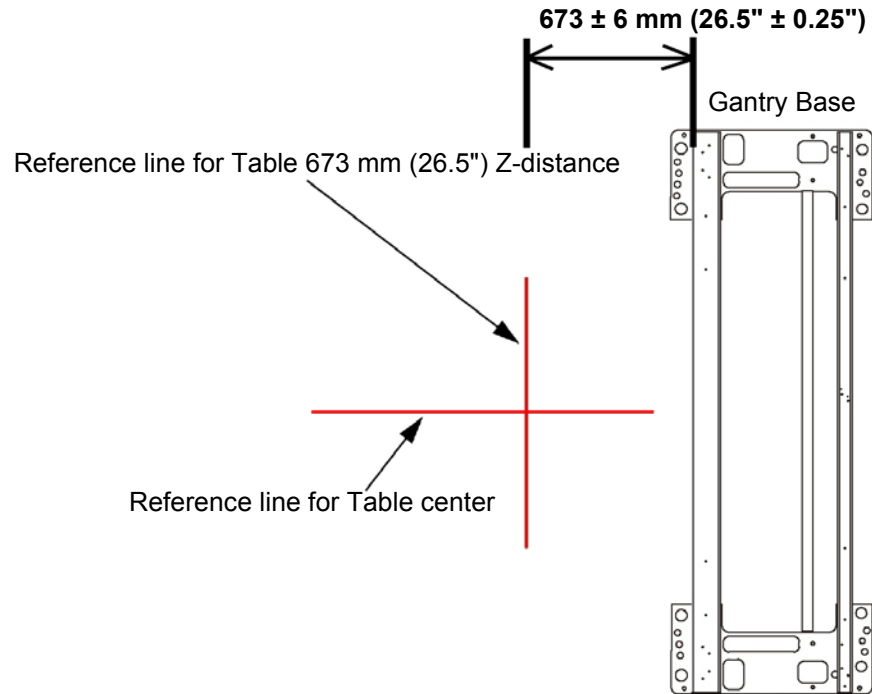


Figure 1-26 Draw Reference Line for Table Center

- 3.) Recheck the table-to-gantry reference line for $673 \pm 6 \text{ mm}$ ($26.5'' \pm 0.25''$) Z-distance. Refer to [Figure 1-26](#).
- 4.) Turn off the laser but do not remove.

9.3.2 Table Prep and Set-up

SAFETY

CAUTION

Potential for Electric Shock.

Equipment is Energized.

Follow appropriate safety procedures when working with an energized system.



CAUTION

Potential for Injury.

Table will tip if not anchored on the dolly.

Make certain that Table is adequately secured to the dolly.



CAUTION

Potential for Injury.

Table on dolly length is 2.5m (98 in.).

Exercise caution when moving the table on the dolly.



PROCEDURE

CAUTION

Potential for Injury.

Table will tip if not anchored on the dolly.

Make certain that Table is adequately secured to the dolly.



- 1.) Remove all the transportation packaging and boxes, except dollies, from the table. (See [Figure 1-27](#).) Leave a layer of packing material on the cradle to protect the cradle from damage. (It can be removed during laser alignment of the table.)



Figure 1-27 Remove Table Packing

- 2.) Unpack the items and locate all of the items needed to install the table.

Note: The GT / VT table on dollies is approximately 118" long and may require additional room to maneuver.

- 3.) Using the table centering and distance locator marks made earlier, wheel the table to its approximate position relative to the gantry.
- 4.) Locate the table leveling pads inside the table in the back and on the side in the front. Preset leveling pad heights to 5/8" (15.5mm). (See [Figure 1-22](#).)

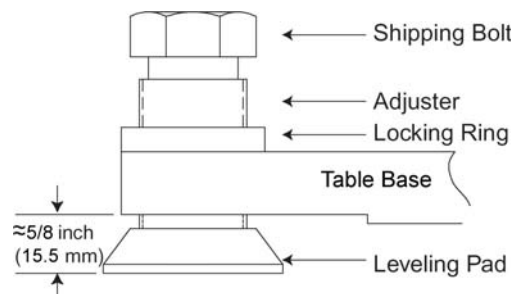


Figure 1-28 Table Base Leveling Pads (Starting Positions)

- 5.) Use a 1-5/8" socket and 1/2" ratchet to loosen the shipping bolt. Loosen the locking rings if present.
- 6.) A 1-1/8" socket is used with the adjuster tool if needed to lower the adjuster.
- 7.) Use the dollies to evenly lower the table until it rests on the leveling pads using a 1/2" ratchet on each end.



Back



Front

Figure 1-29 Adjusters and Lock Rings

9.3.3 Table Cover Removal

- 1.) Remove the table right side cover, as shown in [Figure 1-31](#).
 - a.) Removing the two screws on each end of the underside of the long side cover of the table.
 - b.) Slide each cover forward to unlatch, lift upward slightly to disengage the latches, and remove the side cover. Doing this procedure will require patience and practice to remove and replace this cover.

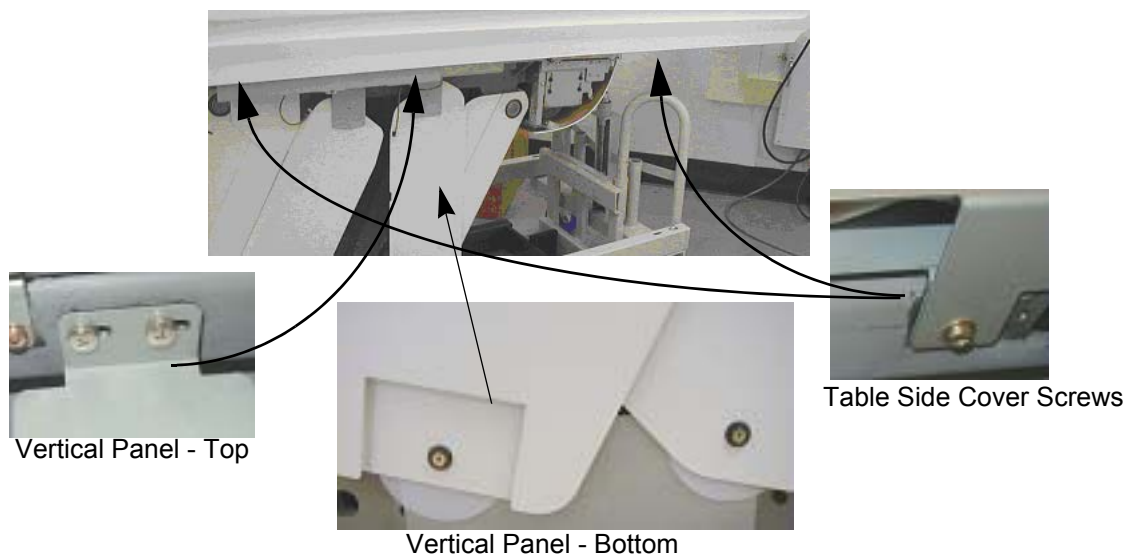


Figure 1-30 Table Covers

- 2.) The table is normally shipped with some of the side/vertical panels removed. If installed, remove the four side panels, using a Pozi drive #1 screwdriver.
- 3.) Carefully lay the side panels on protective padding out of the way.
- 4.) Make sure that all four of the table levelers are on the floor. The table should set on the four levelers with the dollies still installed.
- 5.) Carefully center the four levelers over the 4" (102mm) floor cutouts.
- 6.) Check that the front table base center line is on the chalk table center line.
- 7.) If still present, remove all packing materials and the table cradle pad from the table cradle.

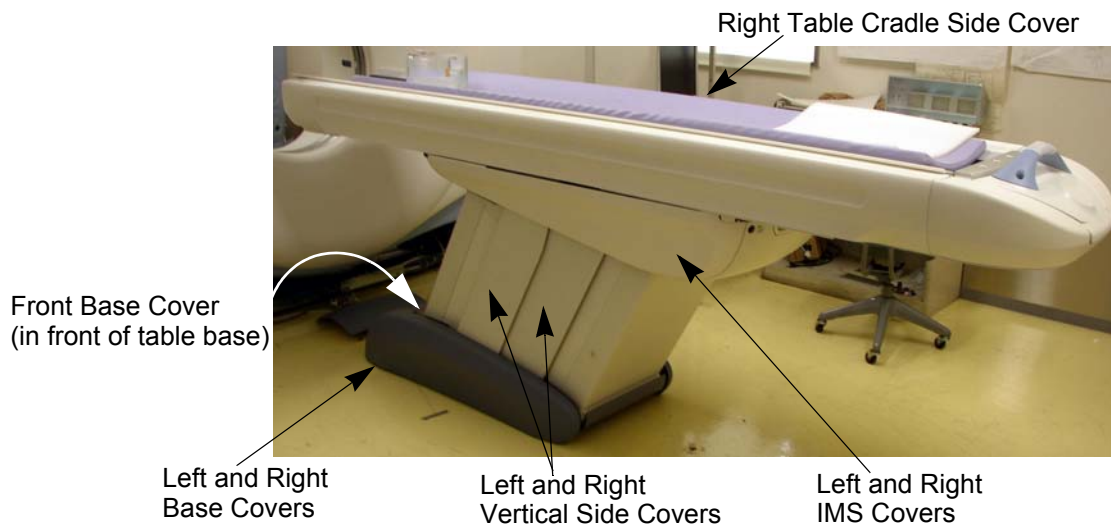


Figure 1-31 Table Covers

9.3.4 Removing the Accessory Rail Strip

- 1.) Remove the accessory mounting strip attached on each side of the cradle using a small flat blade screw driver. The nylon screws are inserted inside the accessory rail on the cradle.
- 2.) Place the accessory strips on the floor and reinstall the nylon screws into the accessory rail for safe keeping.



Figure 1-32 Accessory Rail Screw

9.3.5 Install the Table Cradle Laser Alignment Plates

- 1.) Locate the aluminum accessory tray mounting plate with the three holes on the rear of the cradle. Fit the rear alignment target into the two mounting holes as shown in [Figure 1-33](#). Use the adjustment screw to adjust the fit as needed. See [Figure 1-33](#). The fit should be snug, without play, when you are finished.



Figure 1-33 Cradle Rear Laser Alignment Tool

- 2.) Check that the table base is centered over the table center line, and the base is on the 26.5 in. line (± 0.25 in.) made on the floor.

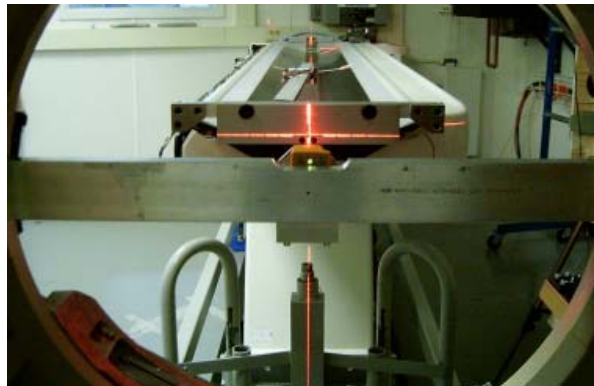


Figure 1-34 Rear Laser Alignment Tool - Installed

- 3.) Lower the table to the floor using the dollies, making sure to maintain the 673mm (26.5 in.) distance.

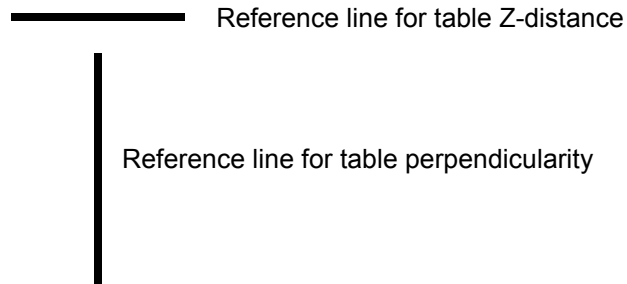
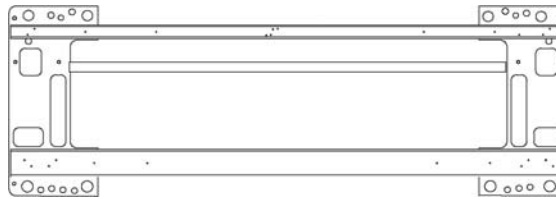


Figure 1-35 Two Reference Lines

9.3.6 Level and Center the Table to the Gantry

9.3.6.1 Conditions

- Before you start, turn on the laser and check that the beam is still on the mark placed on the wall. If not, reset the laser.
- If the mark is not present, use a measuring tape and place a 102 mm (4 in.) piece of masking tape on the cradle at the 1000 mm and on the laser line.
- Table base to cradle alignment location is 1005 mm from the center of cradle to the floor.

9.3.6.2 Specifications

- Table cradle must be level in all directions (centered within the lines on a Johnson Professional level).
- All table adjusters should be preset to 15.5 mm (5/8 in.) down from the table base to make adjustment easier. Based on floor levelness and your experience, a different preset height may work better. One thread must be showing above all locking rings when leveled.
- Table cannot be higher than 1005 mm from floor to cradle.

9.3.6.3 Procedure

NOTICE

Avoid leaning on the cradle during this procedure.

DO NOT pin the gantry during this alignment process.

This procedure as described is for systems mounted on 4 in. (102 mm) concrete floors only!

Note:

If the floor covering was not properly removed with the glue removed or the levelers were not centered over the floor cutouts, the leveler may become trapped against the edge of the floor covering, causing the table to become unlevelled. If this happens, move the table and enlarge the 4 in. (102 mm) floor cutout for the table. Glue removal is important and aids in moving the table to its final location.

- 1.) Have the table side panels removed and have a ratchet, 1-1/8" socket, and a 2-foot level ready to use.
- 2.) Turn on the laser's "I" beam (vertical beams) by pressing the **ON** button 2 times.

- Note: [Step 4](#) through [Step 7](#) are for perpendicular positioning of the cradle to the gantry.
- 3.) The table on the dollies should be resting on the floor, and the laser beam visible on the cradle. The laser light should now shine down the cradle onto the rear vertical target. Moving the table on the dollies by raising and lowering makes it easier to center the table right to left.
- Note: When using the table dolly to move the table, be sure that the shipping bolts are still attached to the adjuster leveler feet.) This prevents the adjuster levelers from gripping on the floor adhesive, making it difficult to move.
- 4.) Move the table so that the base is roughly centered over the scan center line, the front edge of the table base is on the 673 mm (26.5 in.) line, and the table is resting on the floor. Check that the leveling feet are centered in the cutout circles.
 - 5.) Carefully move the table so that the cradle front center line and the back target are aligned. You may need to raise the table to move the table. When aligned, lower the table to the floor.
 - 6.) If not already done - Measure 1000mm from the front of the cradle, and place a piece of tape under the laser center line. Carefully mark a line along the laser line.
 - 7.) The laser beam should now connect the cradle front centerlines, the 1000 mm cradle center line, onto the rear alignment tool vertical center and finally onto the alignment centering mark placed on the wall. The centering alignment line on the wall is used to be sure the laser is still centered. If the alignment line on the wall is NOT on the original mark, readjust the laser and repeat the above steps. See [Figure 1-36](#).

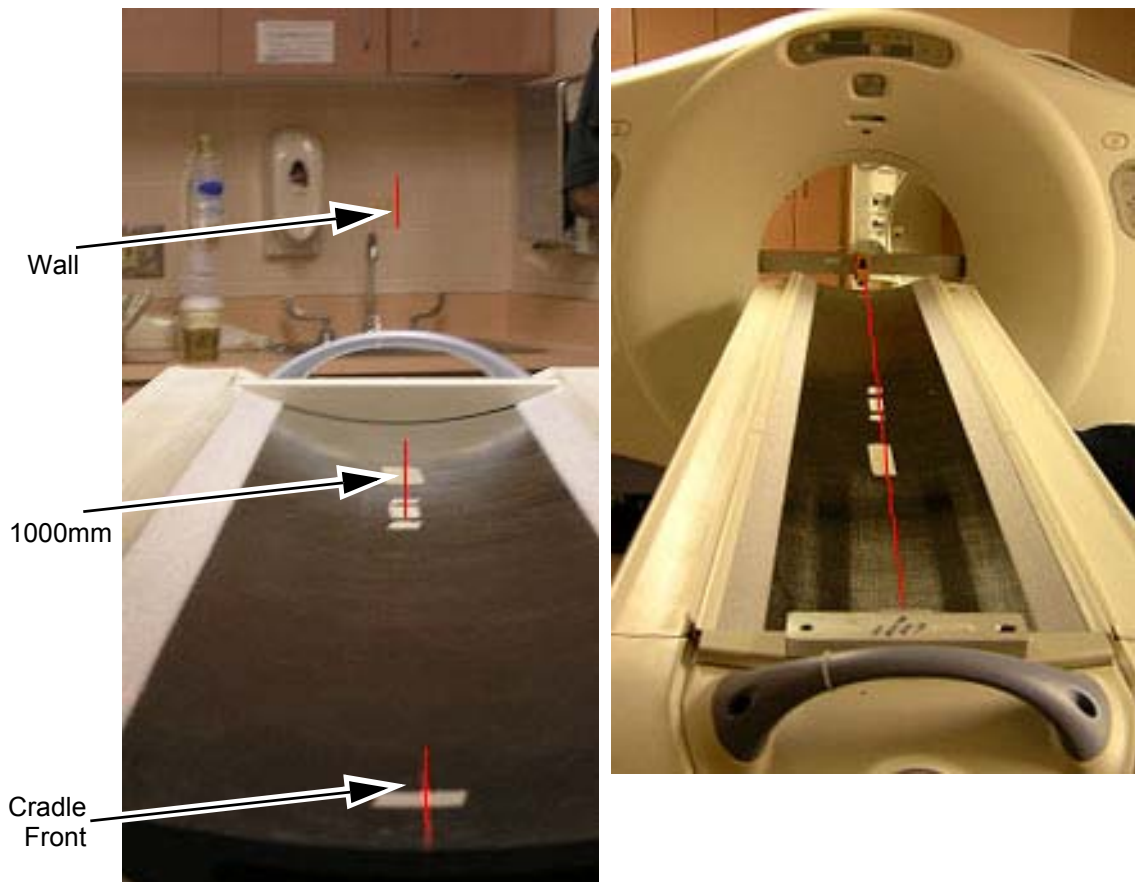


Figure 1-36 Alignment Laser Marks - Table & Wall

- Note: [Step 8](#) through [Step 10](#) are for front-to-back and side-to-side leveling of the cradle.
- 8.) The table should be completely on the floor and resting on all 4 levelers. Carefully remove one side of the table dolly, taking care not to bump or move the table. Either side and/or end of the table dolly assembly can be removed.

CAUTION



Potential for Injury.

In the ship position, the table tips easily!

DO NOT lean on the table! The shipping bracket should still be in place!

9.) Place the bubble level on the table base. Refer to [Figure 1-37](#).

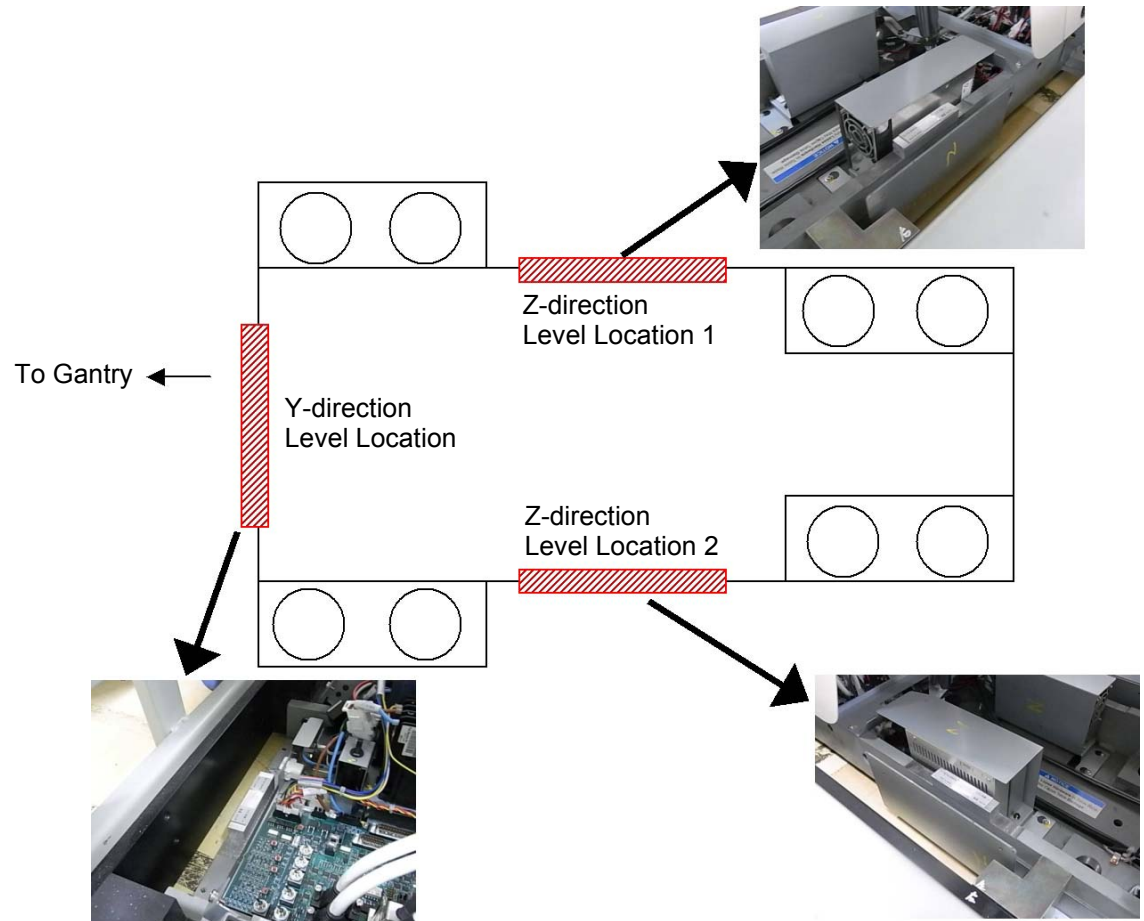


Figure 1-37 Level Location on the Table Base

10.) Raise or lower the table as needed using the front and rear levelers and level the table base in the Z-direction (2 positions) and the Y-direction (1 position).

This process is complete when:

- The cradle is still centered on the front, mid, and rear marks.
- The cradle is leveled in the Z-direction at 2 positions shown in [Figure 1-37](#).
- The bubble is leveled in the Y direction.
- The laser is still centered on the wall center line.
- The table is still on the 26.5" line and the levelers are not resting on the flooring.
- The laser is the same as in [Step 7](#).

Note: The leveling process may take several iterations of [Step 1](#) through [Step 10](#). Patience and accuracy is required to properly complete this process.

11.) When completed, turn off the laser tool.

Note: Do not remove the table dollies.

9.3.7 Tighten the Lock Rings

- 1.) Re-check gantry bubble levels.
- 2.) Re-check that each of the eight adjuster is loaded by attempting to turn it.
- 3.) Tighten the lock rings at all locations with the spanner, where possible. Use a hammer and chisel to tighten the lock rings only where you can not use the spanner.

CAUTION

Eye protection is required when using a hammer and chisel.



Section 10.0 Table Installation (Lite Table)

10.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|-------------------------|--------------|
| 2 (FE or mechanical supplier) | | 1.5 hours labor on-site | |

10.2 Tools and Test Equipment

- Standard Install Tool Kit
- 3/4", 1-1/4", 1-1/2" and 1-5/8" sockets
- 8mm, 10mm, and 14mm hex socket bits
- Laser Alignment kit
- Johnson Professional 6" level
- Johnson Professional 4' level
- Johnson Professional 2' level

10.3 Procedures

10.3.1 Draw Table Reference Lines

- 1.) Draw a reference line of 564mm position from Gantry Base on the floor as shown in the [Figure 1-38](#).

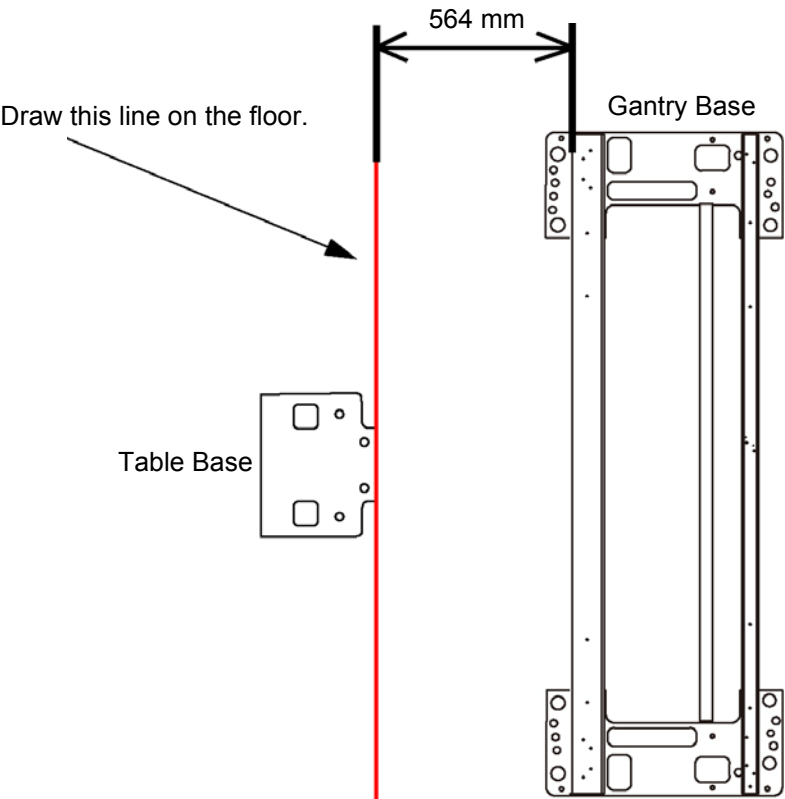


Figure 1-38 Draw Reference Line

- 2.) Remove all the transportation packaging and boxes, except dollies, from the table.
- 3.) Wheel the table to its approximate position relative to the gantry, using the marks made earlier.
 - a.) Locate the table leveling pads and position them against the base of the table, using the adjusters with a $1\frac{1}{2}$ " socket and $\frac{1}{2}$ " ratchet.
 - b.) Use the dollies to evenly lower the table until it rests on the leveling pads using an $\frac{1}{2}$ " ratchet.

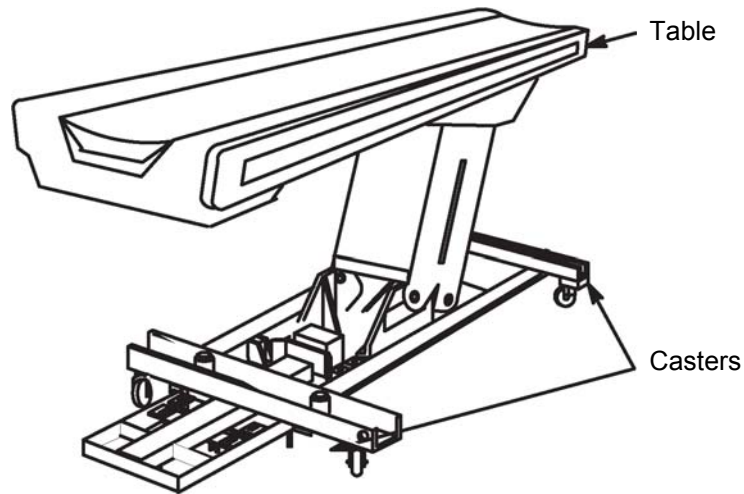


Figure 1-39 Moving the Table

- 4.) Preset leveling pad heights to 20mm, see [Figure 1-40](#).

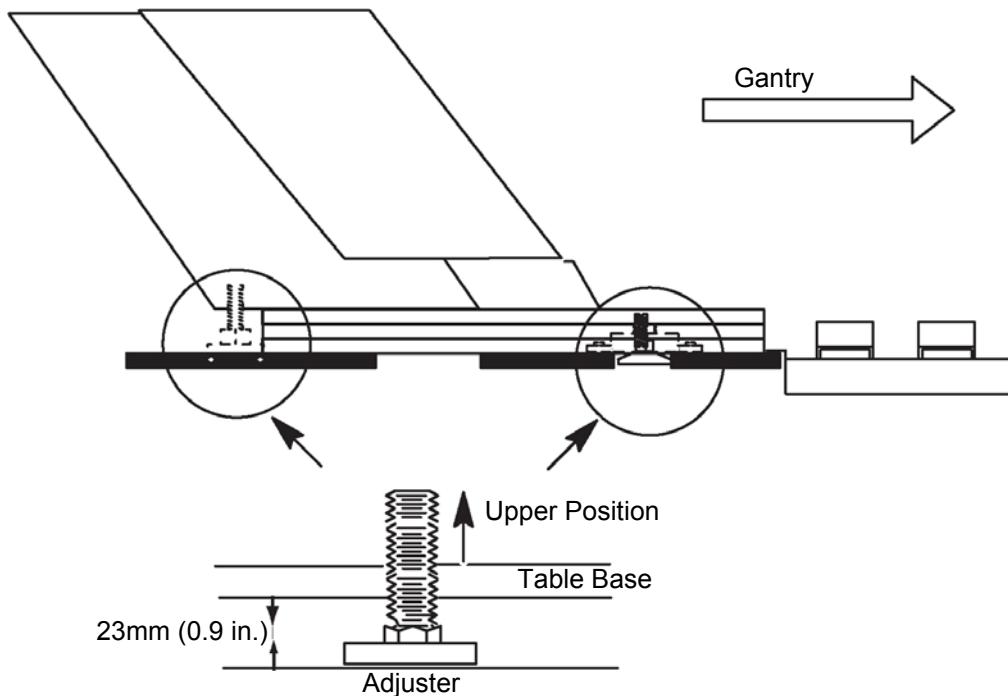


Figure 1-40 Setting the Adjusters

To adjust two leveling pads at rear end of table, please insert the screw driver into the hole located on the bolt then rotate the bolt, refer to the [Figure 1-41](#).

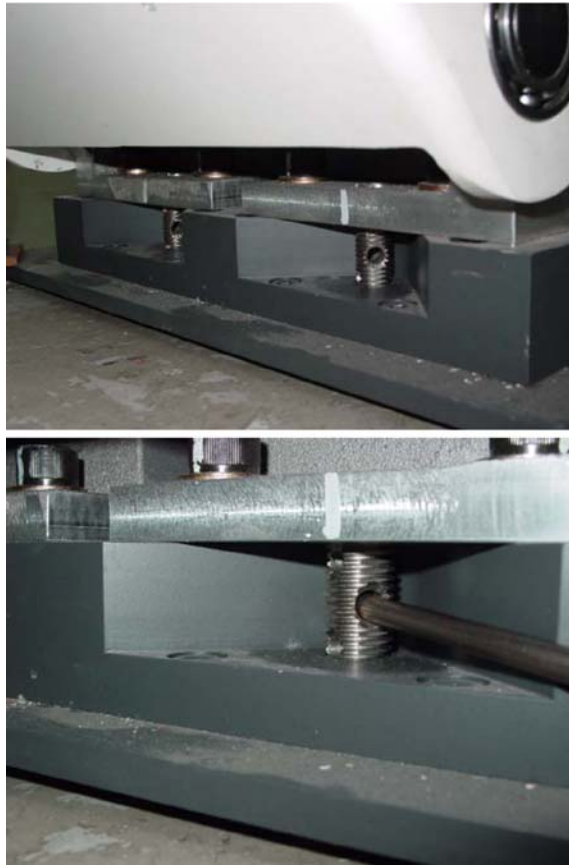


Figure 1-41 Adjust Leveling Pads

10.3.2 Cradle Center Procedure

- 1.) Remove a bottom cover under a cradle handle. See [Figure 1-42](#).



Figure 1-42 Remove Bottom Cover

- 2.) Release a latch by pushing a bracket to move the cradle by hands. See [Figure 1-43](#).

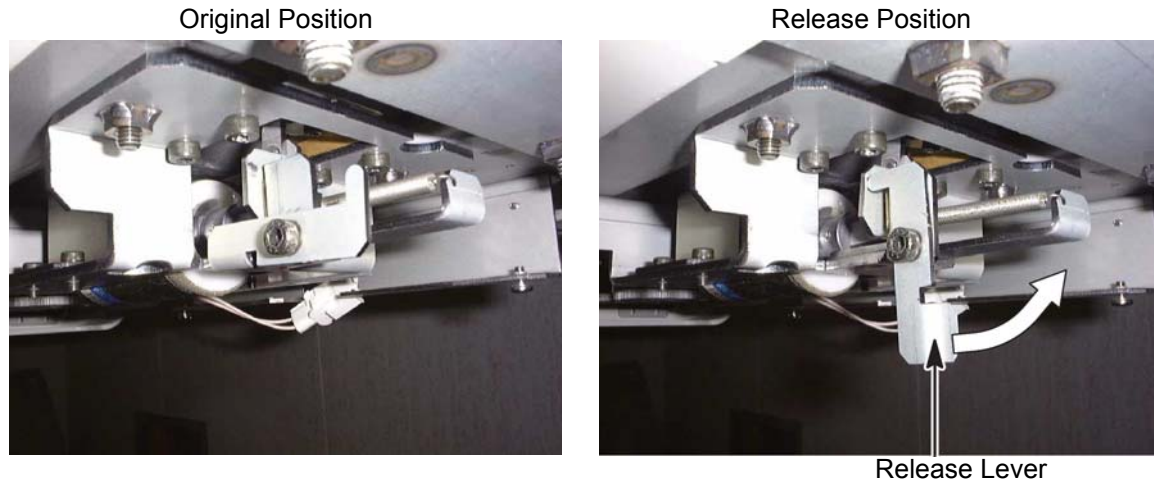


Figure 1-43 Release the Cradle

- 3.) Center the cradle on the drive rollers assembly by pushing the cradle into the gantry to its maximum position and back to just before the latch position six times. The cradle should be centered.

You must push and pull a center of cradle hand. See [Figure 1-44](#).



Figure 1-44 Push and Pull Cradle

10.3.3 Install the Table Cradle Laser Alignment Plates

Required tool: TG-alignment tool 5180876

- 1.) Install the front table laser alignment which has a cross slot to the front of the cradle.
- Loose adjustment knob to make the slot plate free.
 - The slot in the front of the tool should be over the cradle center-line. See [Figure 1-45](#).



Figure 1-45 Front Table Laser Alignment

- c.) Tighten adjustment knob.
- 2.) Install the rear table laser alignment which has a cross target to the back of the cradle.
 - a.) Loose adjustment knob to make the slot plate free.
 - b.) The slot of the tool should be over the cradle center-line. See [Figure 1-46](#).



Figure 1-46 Rear Table Laser Alignment

- c.) Tighten adjustment knob.
- 3.) Check that table base is centered over the table center line, and the base is on the 564mm line made on the floor, see [Figure 1-38](#).

10.3.4 Level and Center the Table to the Gantry

10.3.4.1 Conditions

- Before you start, turn on the laser and check that the beam is still on the mark placed on the wall. If not, reset the laser.
- If the mark is not present, use a measuring tape and place a 102 mm (4 in.) piece of masking tape on the cradle at the 1000 mm and on the laser line.
- Table base to cradle alignment location is 1005 mm from the center of cradle to the floor.

10.3.4.2 Specifications

- Table cradle must be level in all directions (centered within the lines on a Johnson Professional level).
- All table adjusters should be preset to 20 mm (3/4 in.) down from the table base to make adjustment easier. Based on floor levelness and your experience, a different preset height may work better. One thread must be showing above all locking rings when leveled.
- Table cannot be higher than 1005 mm from floor to cradle.

10.3.4.3 Procedure

NOTICE Avoid leaning on the cradle during this procedure.
DO NOT pin the gantry during this alignment process.
This procedure is for systems mounted on 102 mm (4 in.) concrete floors only!

Note: If the floor covering was not properly removed with the glue removed, or the levelers were not centered over the floor cutouts, the leveler may become trapped against the edge of the floor covering, causing the table to become unlevel. If this happens, move the table and enlarge the 102 mm (4 in.) floor cutout for the table. Glue removal is important and aids in moving the table to its final location in accordance with the floor levelness specification.

- 1.) Place the bubble level on the table base . See [Figure 1-47](#).



Figure 1-47 Place Bubble Level

- 2.) Turn on the laser's "I" beam (vertical beam) by pressing the ON button 2 times.
- 3.) With the laser on, the laser light should shine through the front tool down the cradle connecting the front and rear center lines and onto the center of the rear alignment tool.
- 4.) Raise or lower the table as needed using the two front and two rear adjusters so that this line is shining 100% in the machined grooves of each alignment tool.(it is easier to raise, move, and lower the table using the table dolly. This prevents the adjuster levelers from gripping on the floor adhesive, making it difficult to move.)
 - a.) The light will shine vertically down the table.
 - b.) Both center lines on the cradle front and rear should be connected when done.
 - c.) Level of the table influences a center position, The vertical laser alignment light must match and be centered on the white line on the front of the table and in the groove of back alignment plate. See [Figure 1-48](#).

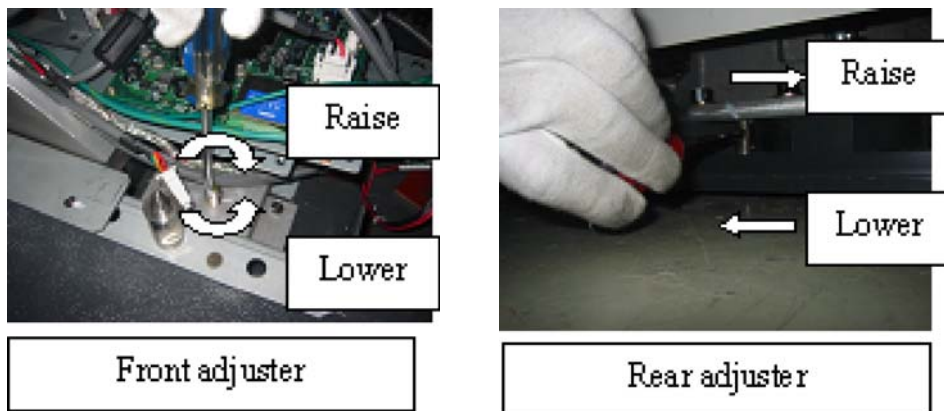


Figure 1-48 Front and Rear Adjuster

- 5.) Be sure that all adjusters bear part of table's load.

Section 11.0 Drill the Anchor Holes

WARNING POTENTIAL FOR PATIENT INJURY.



IMPROPERLY SECURED TABLE MAY TIP, DISLODGING PATIENT.

PROPER ANCHORING IS KEY TO MAINTAINING PATIENT SAFETY DURING SYSTEM OPERATION.

11.1 Notes to Mechanical Installers

Note 1: Basic Anchoring Information

GE provided floor anchors are designed for use **ONLY** on concrete floors that meet the 4-inch concrete floor requirement. Supplied floor anchors must be installed by a trained contractor, and shall be set to a minimum depth of 3-inches at each anchor point. ANY anchors having more than 1-inch of thread showing above the nut, when torque is set to 55 lb.-ft, shall have a second anchor installed in the closest adjacent hole. This is because the minimum anchor engagement length in the concrete was not met. The second anchor shall be installed to the standard depth and torque specification. Do not cut anchor bolts that extend longer than the 1-inch limit.

Note 2: Alternate Anchoring

If at least four anchors cannot be set for the gantry, and at least four anchors for the table using the alternate anchor holes, then the installer must inform the PMI that the minimum anchoring cannot be met. Additionally, the customer's structural engineering contractor must be engaged to determine the anchoring method, set the anchors, and certify that their anchoring meets the stated GE minimum load requirement and torque specification.

Note 3: Non-Concrete Floors

All other anchoring methods - on floor types other than the concrete minimum - must be determined at the customer's expense by a structural engineering contractor. The anchoring and method must be certified by the customer's contractor to meet the stated GE minimum load requirement and torque specification.

Note 4: GE Notification

It is not the role of mechanical contractors or installers (FEs) to determine acceptable methods to install or anchor equipment on non-4-inch concrete floors. The PMI or appropriate GE contact person shall be notified that the facility's floor type **DOES NOT MEET** the installation mounting requirement for the installation procedure (described in this Installation Manual), and therefore the table-gantry mounting process **CANNOT** continue.

11.2 Requirements

Tools Required

- Standard Install Tool Kit
- Hammer Drill
- ½" x 12" Drill Bit (Metric equivalent must not be used)
- ½" Drill Bushing (shipped in install support kit)
- Vacuum with HEPA or drywall dust filter
- Vacuum Hole Attachment - to clean debris from the holes

- PPE

Time and Personnel

- .5 hour labor on site
- 2 Engineers

11.3 Drilling Procedure (For Gantry and GT1700V Table)

For Lite Table drilling procedure, refer to [11.4 Drilling Procedure \(For Lite Table\)](#), on page 73.

Note: The gantry rear cover should still be removed and the table should still be on the dolly.

- 1.) Make sure that all table and gantry levelers (four each) are firmly on the concrete floor.

NOTICE
Potential for
Equipment
Damage from
Dust

To prevent damage due to the dust created during drilling, you must cover all electronic assemblies in the table base prior to drilling.

- 2.) Locate the hammer drill and $\frac{1}{2}$ " X 12" drill bit. The $\frac{1}{2}$ " bit will be used to drill all eight (8) table and gantry anchor holes. You must use the drilling bushing to drill gantry holes. All primary holes can be drilled with the gantry covers installed.

Note: Drilling bushing cannot be used for the table holes.

- 3.) Use a piece of tape to mark the drill bit depth of 7- $\frac{1}{2}$ " (190mm) from the tip of the $\frac{1}{2}$ " masonry drill bit.
- 4.) Use the $\frac{1}{2}$ " bit to drill all eight (8) anchor holes to a depth of 7- $\frac{1}{2}$ " (190mm) as measured from the top of the drill bushing. Review [Figure 1-49](#) and [Figure 1-50](#) prior to drilling.

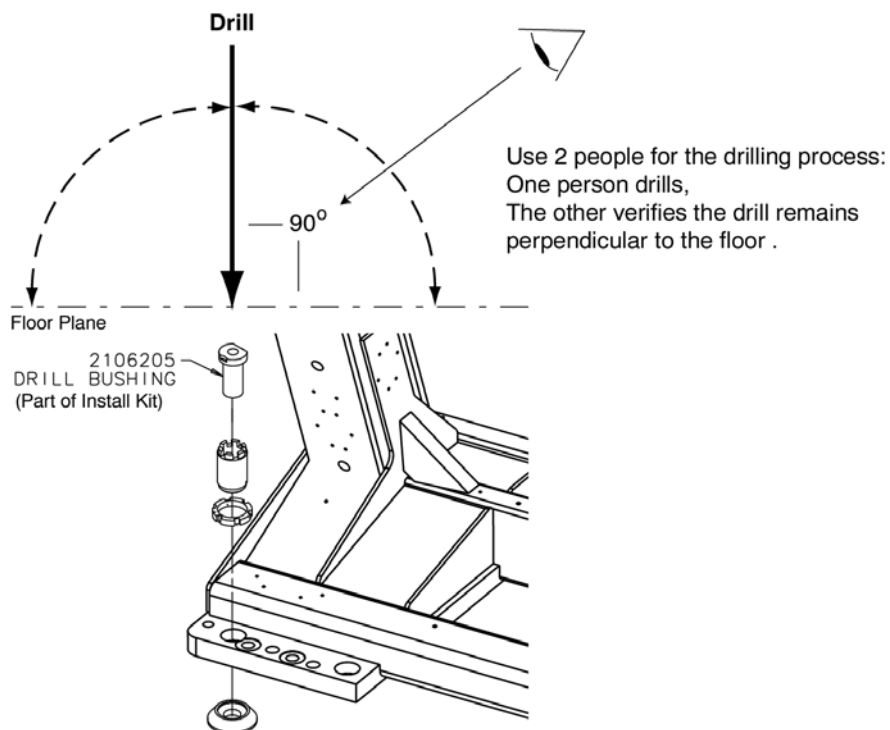


Figure 1-49 Drilling Position

- 5.) Place appropriate protection to prevent damage and dust contamination to electronic assemblies.
- 6.) Place the drill bushing inside each adjuster, to keep the hole vertical and centered within the adjuster.
 - Use the drill bushing to center the anchor holes in all adjuster locations, to provide maximum lateral alignment capacity when you center the cradle on isocenter during subsequent system testing.
 - Take care not to injure yourself on the gantry cover brackets.
- 7.) Drill the holes perpendicular to the floor.

Important - Follow these guidelines when drilling anchor holes:

- While one person drills the holes, position a second person to watch the relationship between the drill bit and floor. Make sure the bit remains absolutely perpendicular to the floor throughout the drilling operation.
- Always use the mechanical guide when drilling.
- Stop drilling every 15 or 20 seconds and clear the hole of debris. This lets the drill bit cool and helps to prevent binding of the drill bit.
- Vacuum while drilling to keep gantry and table as free of dust contamination as possible. Place the funnel tip or long extension tip inside the hole.

A drywall dust filter must be used on the vacuum.

- Drill each hole until the mark on the drill bit is even with the top of the drill bushing. All holes must be a minimum of 7.5" (190 mm) deep, as measured from the top of the adjuster to the bottom of the hole. (See [Figure 1-55, on page 77](#)) Use an upside-down anchor to check the hole depth.
- 8.) Recheck the depth of all holes by inserting an anchor backward into the hole. A ½" (13mm) or less should be showing. Re-drill if needed.
 - 9.) When finished drilling and clearing the anchor holes, vacuum the debris from the inside of each of the holes and from the surrounding (floor) area.

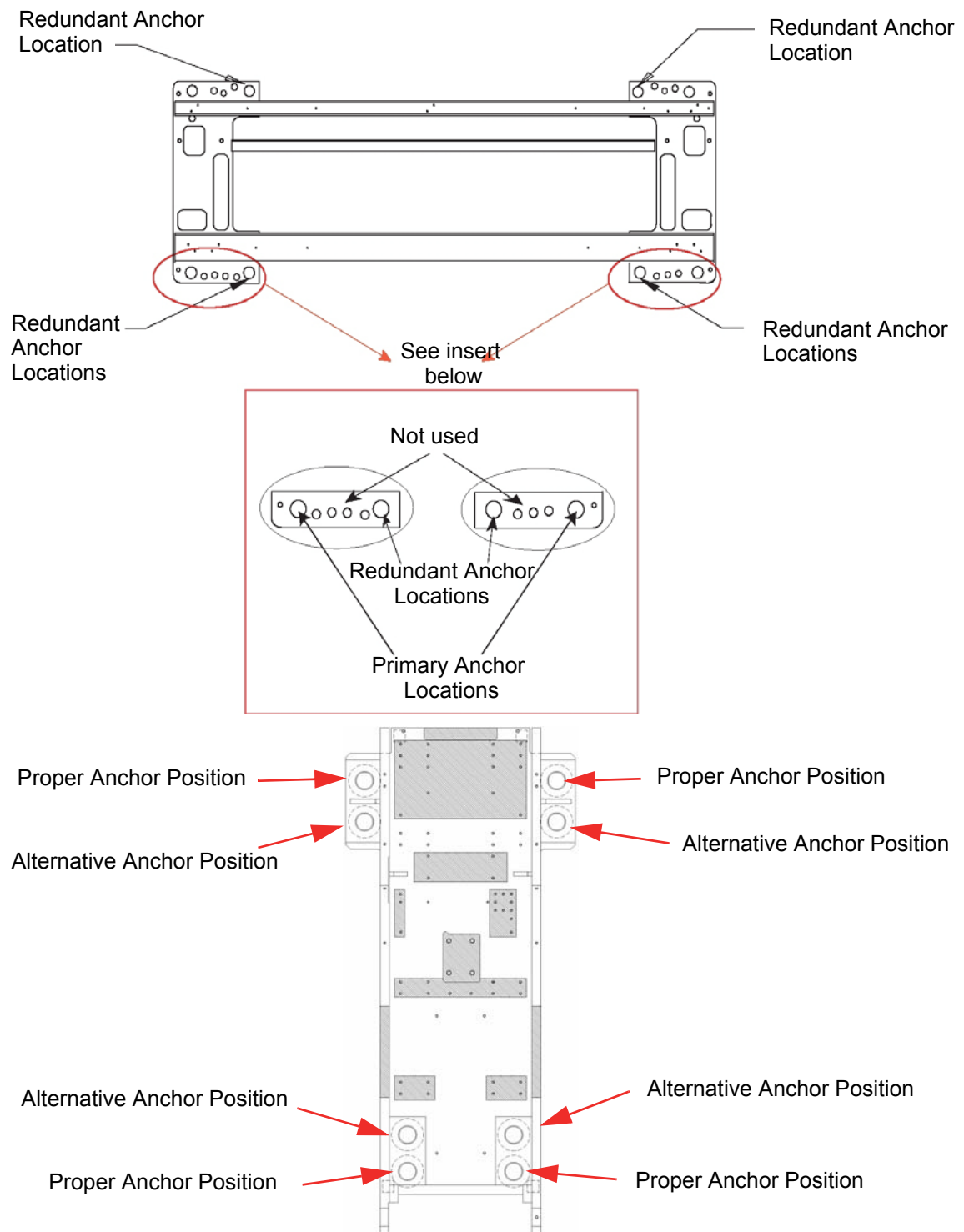


Figure 1-50 Anchor Locations

Note: If alternate location(s) are used to anchor the table or gantry, you must move the respective leveler(s) and pad(s) to the new alternate location(s) and re-drill.

11.4 Drilling Procedure (For Lite Table)

When the room-layout template is used, the anchor bolts have been installed. If it is, perform the following. If it is NOT, perform all procedures of this section.

- Table Leveling (This section)
- Tighten the anchor nuts with the insulating plate and washer.

TORQUE: Approx. 5 N-m

NOTICE Do not tighten the anchor nuts to the specified torque (50 N-m). To over-tighten nuts will damage the frame of the Gantry and also bring an out-of-level Gantry.

- Verify that the Table to Gantry Alignment should be correct.

This anchoring procedure is one for the anchor kit shipped with the system.

NOTICE The minimum Tensile load strength of the anchor must be 13000 N.

- 1.) Verify that the table flapper is removed to make space for anchoring. If it is not, remove the table flapper by removing the four flapper Assy mounting bolts.

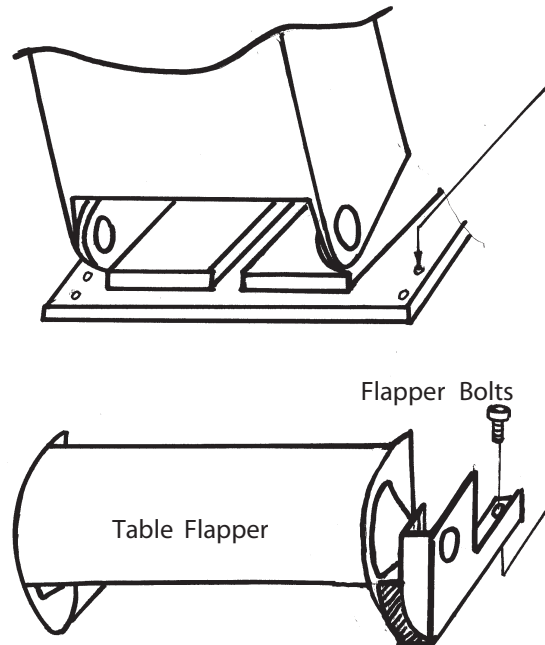


Figure 1-51 Table Flapper Removal

- 2.) Prepare and tape ½" concrete drill bit.
- 3.) Make holes at the anchor position as shown in [Figure 1-37](#), using electric drill with the bit prepared in the previous step, so that the lower edge of the tape just touch the floor surface.

NOTICE During drilling, always keep the drill bit perpendicular to the floor. With one person drilling the hole, a second person can visually insure perpendicularity throughout the drilling operation. Clear the hole of debris several times while drilling to prevent the drill bit from binding.

- 4.) Attach a piece of tape to the ½" concrete drill bit in order to assure a minimum of 100 mm depth of anchor hole.
- 5.) ½" Concrete Drill Bit Preparation

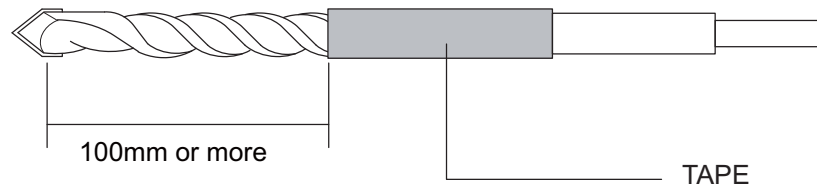


Figure 1-52 Drill Bit Preparation

- 6.) Use the vacuum cleaner to suck up the concrete dust from the hole. Also vacuum dust from the surrounding area when finished.
- 7.) Place the bubble level at the positions.
- 8.) Level the Table using the four adjusters. (The front sides of the adjuster contain the lock nut. After level adjustment, tighten the lock nuts securely.)

Level Specification: +/- 0.5 mm/1000 mm

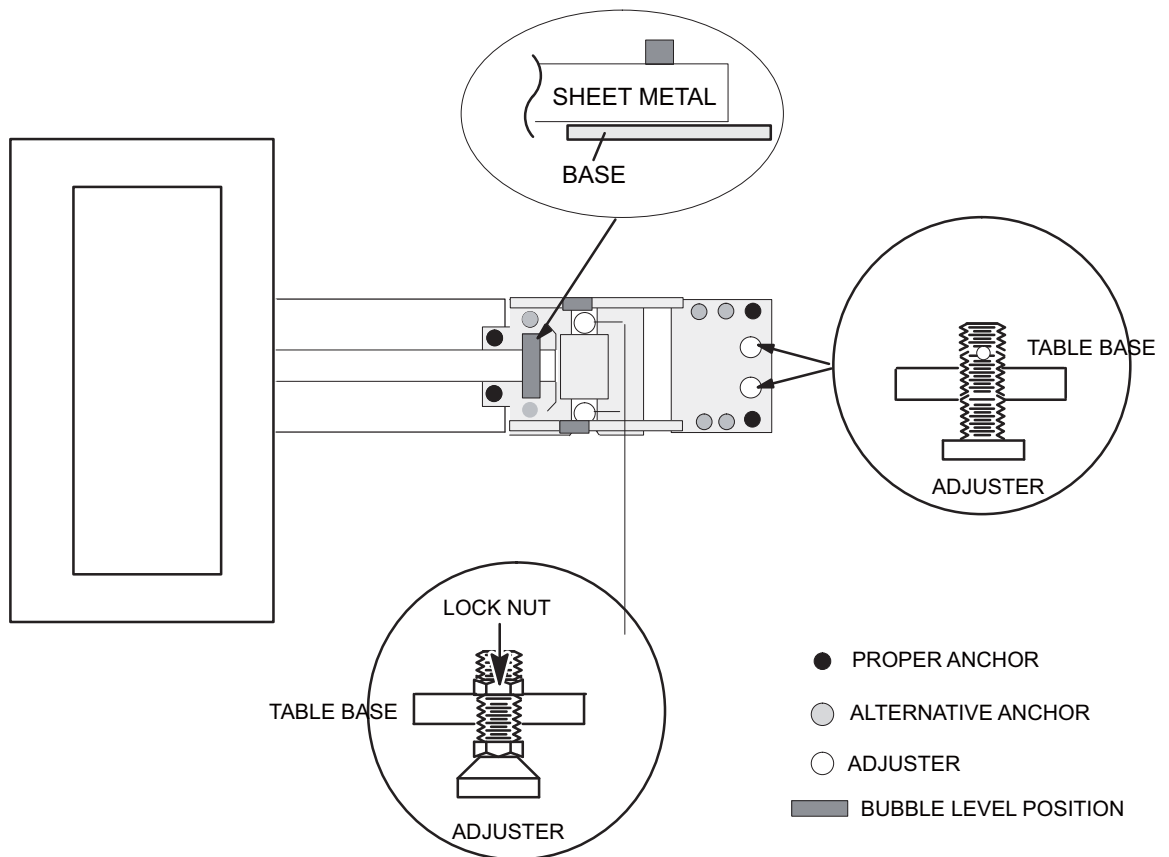


Figure 1-53 Table Adjuster and Bubble Level Position

- 9.) Check that the Cradle is also leveled.

11.5 Gantry & Table (GT1700V) Alternate Anchor Holes

For Lite Table alternate anchor holes procedure, refer to [11.6 Lite Table Redundant Anchor Holes, on page 76](#).

If you cannot use one of the adjuster anchor holes due to structural interference, such as reinforcement bars in the concrete, you must use one of the alternate anchor locations, as shown in [Figure 1-50](#). You must also move the respective leveler(s) and pad(s) to the new alternate location(s) and re-drill.

- Note: Do not remove the adjuster to move to the alternate anchor hole.
- The gantry requires a minimum of four (4) anchors, one (1) in each corner.
 - The table requires a minimum of four (4) anchors, one (1) at location.

If you must use an alternate anchor hole in the gantry, you must remove the gantry covers to drill the holes. See [Appendix A Gantry Cover Removal and Dolly Setup, on page 165](#) for gantry cover removal.



POTENTIAL FOR PATIENT INJURY.
IMPROPERLY-SECURED TABLE MAY TIP, DISLODGING PATIENT.
PROPER ANCHORING IS KEY TO MAINTAINING PATIENT SAFETY DURING SYSTEM OPERATION.

- Note: It is the purchaser's responsibility to provide an approved support structure and mounting method for all floor types other than those listed. General Electric is not responsible for any failure of the support structure or method of anchoring, including seismic requirements and/or through-bolting.
- Note: GE is not responsible for anchoring methods other than those listed in the pre-installation manual. Provided floor anchors are designed for use **ONLY** on concrete floors that meet the 4-inch concrete floor requirements.

| MOUNTING REQUIREMENTS | GANTRY | TABLE (GT1700V) |
|---------------------------------------|-------------------------------|-------------------------------|
| Minimum Floor Thickness: | 102 mm (4 in.) | 102 mm (4 in.) |
| Recommended Drilling Depth: | 95 mm (3-¾ in.) | 95 mm (3-¾ in.) |
| Average Anchor Embedment: | 89 mm (3-½ in.) | 89 mm (3-½ in.) |
| Minimum Anchor Embedment: | 76 mm (3 in.) | 76 mm (3 in.) |
| Available Alternate Anchor Locations: | Yes | Yes |
| Shipped Anchor Size: | 203 mm (8 in.) | 203 mm (8 in.) |
| Alternate Anchoring Methods: | Yes (see notes, above) | Yes (see notes, above) |
| FLoor Levelness Requirement: | 6 mm (½ in.) over 3 m (10 ft) | 6 mm (½ in.) over 3 m (10 ft) |

Table 1-3 Gantry and Table Mounting Requirements

11.6 Lite Table Redundant Anchor Holes

The table requires a minimum of four (4) anchors, one (1) in each corner of table base.

Note: If any obstruction is found under the proper anchoring position, stop drilling and use the alternate position (see Figure 1-54). Use the alternate positions only when the case its corresponding proper position is not possible.

| MOUNTING REQUIREMENTS | TABLE (LITE TABLE) |
|---------------------------------------|-------------------------------|
| Minimum Floor Thickness: | 110 mm (4-1/3 in.) |
| Recommended Drilling Depth: | 100 mm (4 in.) |
| Average Anchor Embedment: | 90 mm (3-½ in.) |
| Minimum Anchor Embedment: | 80 mm (3 in.) |
| Available Alternate Anchor Locations: | Yes |
| Shipped Anchor Size: | 140 mm (5-½ in.) |
| Alternate Anchoring Methods: | Yes (see notes, above) |
| Floor Levelness Requirement: | 6 mm (½ in.) over 3 m (10 ft) |

Table 1-4 Lite Table Mounting Requirements

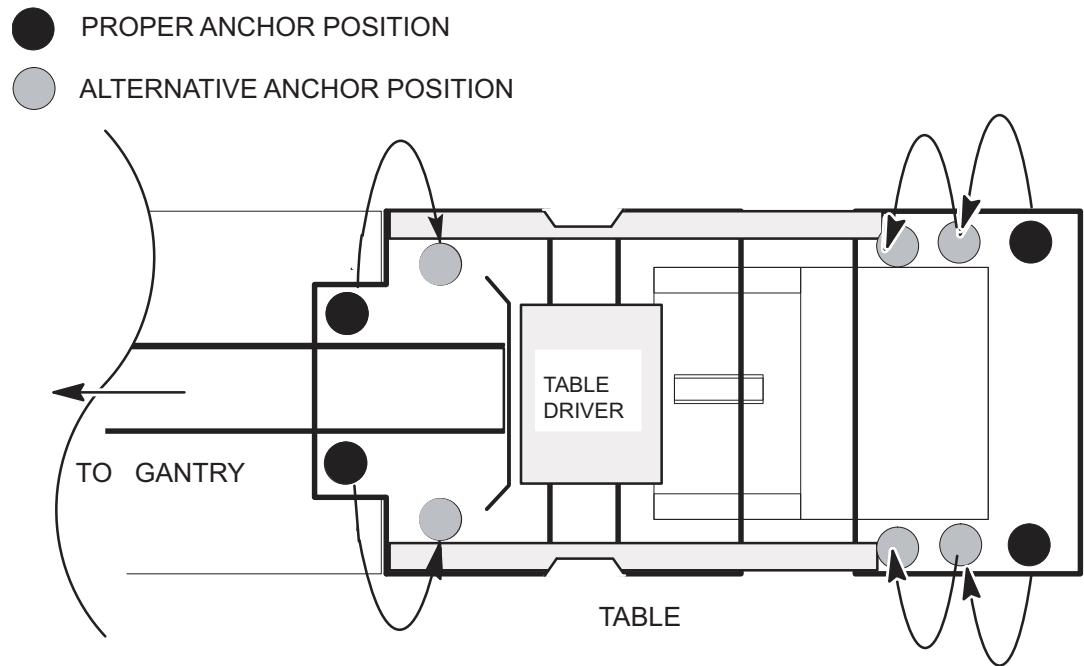


Figure 1-54 Lite Table Anchor Positions (Proper and Alternative)

11.7 Install the Anchors (For Gantry and GT1700V Table)

For Lite Table anchor procedure, refer to [11.8 Install the Anchors \(For Lite Table\)](#), on page 78.

Recommended - Use "Hilti Kwik-Bolt II" anchors P/N 2106573 (½" dia. by 8" long) as shipped with the system for this procedure.

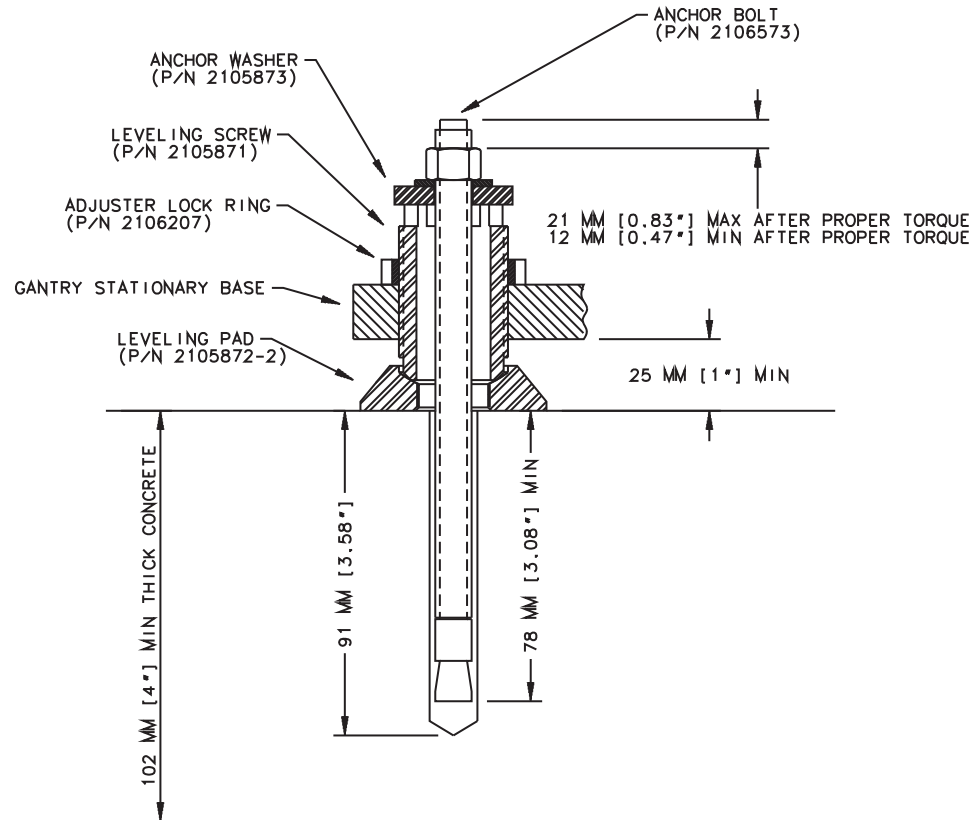


Figure 1-55 Gantry and GT1700V Table Anchor Assembly

- 1.) Assemble the anchors before you install them. Refer to [Figure 1-55](#).
 - a.) Remove the nut and washer from the anchor.
 - b.) Add a ¼" thick washer (PN 2105873) under the regular anchor washer.
 - c.) Reassemble the anchor washer and nut and position nut so top is flush with threads of anchor.
- 2.) Use the anchor seating tool to hammer anchors into the holes.
- 3.) Adjust all eight (8) anchor bolts until tight.

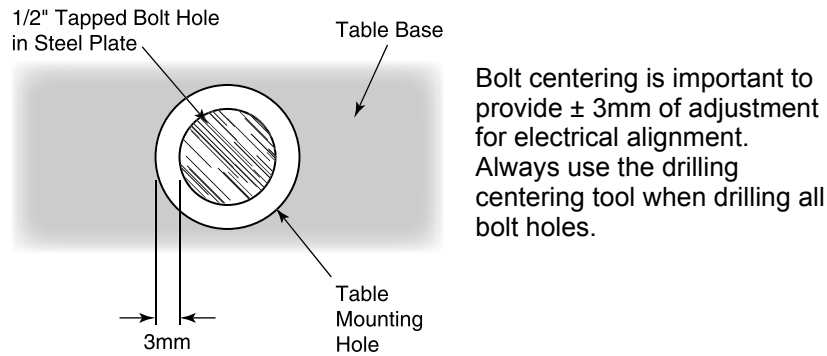


Figure 1-56 Center tapped holes under mounting holes in table base

11.8 Install the Anchors (For Lite Table)

Recommended - Use "Hilti Kwik-Bolt 3" anchors P/N 2106573-3 (12.7 mm ($\frac{1}{2}$ ") dia. by 140 mm (5- $\frac{1}{2}$ ") long) as shipped with the system for this procedure.

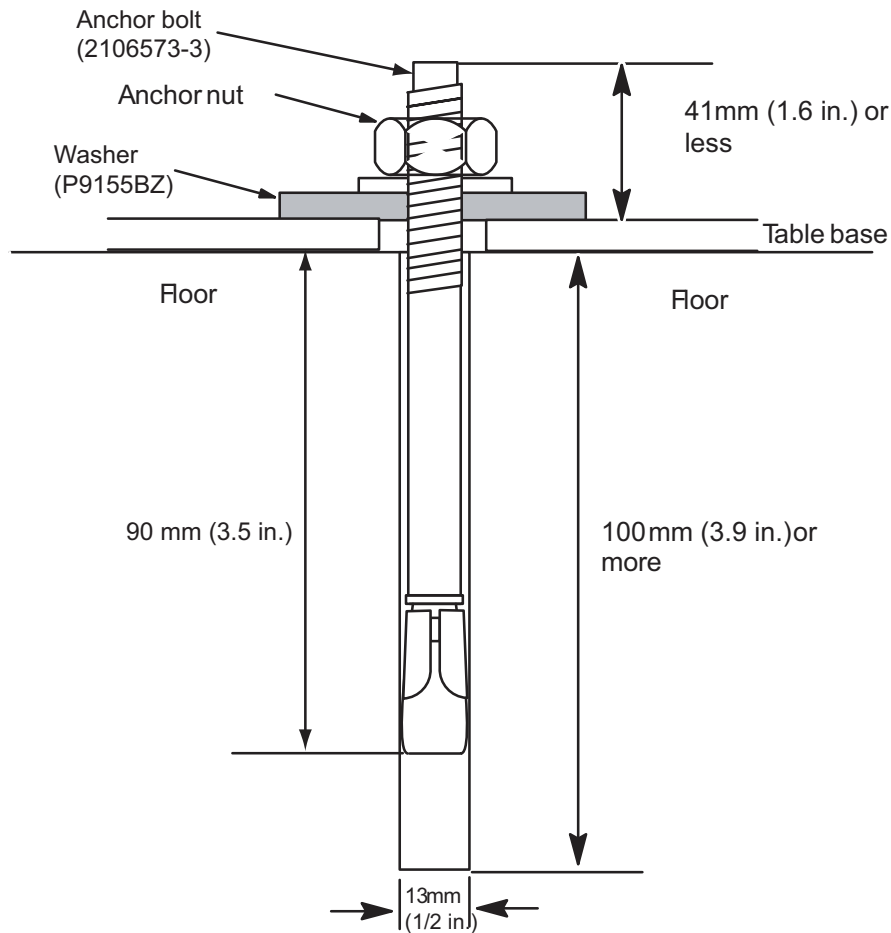


Figure 1-57 Lite Table Anchor Assembly

- 1.) Remove the alignment tool and repack the install kit.
- 2.) Assemble the anchors before you install them. Refer to [Figure 1-57](#).

- a.) Remove the nut and washer from the anchor.
 - b.) Add a 1/4" thick washer (PN P9155BZ) under the regular anchor washer.
 - c.) Reassemble the anchor washer and nut and position nut so top is flush with threads of anchor.
- 3.) Adjust all anchor bolts until tight.

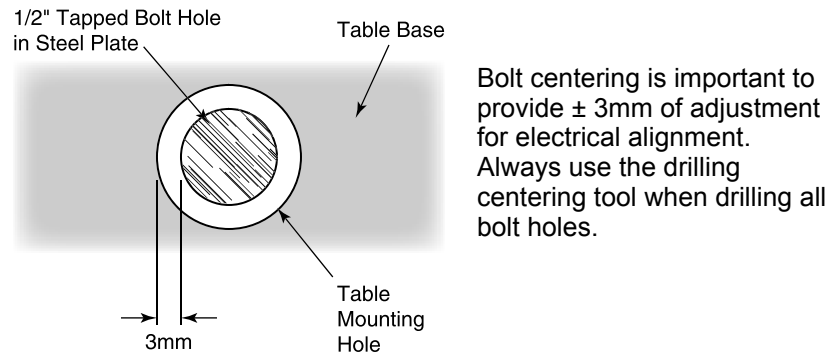


Figure 1-58 Center tapped holes under mounting holes in table base

11.9 Alignment Recheck

Note: Alignment is critical. Recheck carefully.

- 1.) Turn on the alignment tool and recheck alignments. The table alignment must be the same as in [9.3.6 Level and Center the Table to the Gantry, on page 59](#). If re-leveling is required, repeat this procedure. Using the bubble levels, make adjustments as required to maintain required alignment.
- 2.) Once alignment has been verified, torque all mounting bolts. Tighten the location #1 through #7 anchors and torque to:
 - Gantry and GT1700V Table: $75 \pm 6 \text{ N-m}$ ($55 \pm 5 \text{ ft.-lb.}$)
 - Lite Table: $50 \pm 6 \text{ N-m}$ ($37 \pm 5 \text{ ft.-lb.}$)
- 3.) Remove the laser tools.
- 4.) Reinstall all the removed table panels and hardware.
- 5.) Reinstall the gantry rear cover.

Note: If you cannot replace the lower table cover because the floor interferes, adjust all of the table and gantry levelers by half-turn increments to raise the table/gantry until the lower table covers clear the floor. Then return to the alignment sections to level the gantry, level the table, and tighten the locking rings, respectively.

11.10 Removing Table Shipping Dollies

11.10.1 Time and Personnel

(FE or mechanical supplier)

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|------------------|------------------|-----------------------|--------------|
| 1 Electrician | | 20 min. labor on-site | |

11.10.2 Tools and Test Equipment

- Standard Installation Tools Kit

11.10.3 Preparation

- All table mechanical alignment procedures are completed.
- The table is on the floor with at least one anchor in place.

11.10.4 Procedure

Refer to [Figure 1-59](#) for the location of items in the table dolly.

- 1.) Remove the two, long side (stabilizer) rails using the quick disconnect pins. There is one pin on each end of the bar.
- 2.) Carefully slide the bar out and place the bars on the side, out of the traffic area.

Note: The table should be resting on the floor. You may need to lower or raise the dolly to remove the dolly ends.

- 3.) Using the quick release pins, remove each end of the dolly.
- 4.) Slide the dolly off of the long attachment bar on each side.
- 5.) Using the quick release pins, remove the two long attachment bars that are attached to the front and rear table attachment points. Place the bars on the side, out of the traffic area.
- 6.) Use the 19 mm wrench to remove the bolts on each side of the smaller front table attachment bracket. Remove the bracket.
- 7.) Use the 19 mm wrench to remove the bolts on each side of the larger front table attachment bracket and transporter base. Remove the bracket.
- 8.) Reassemble the dolly for transportation.

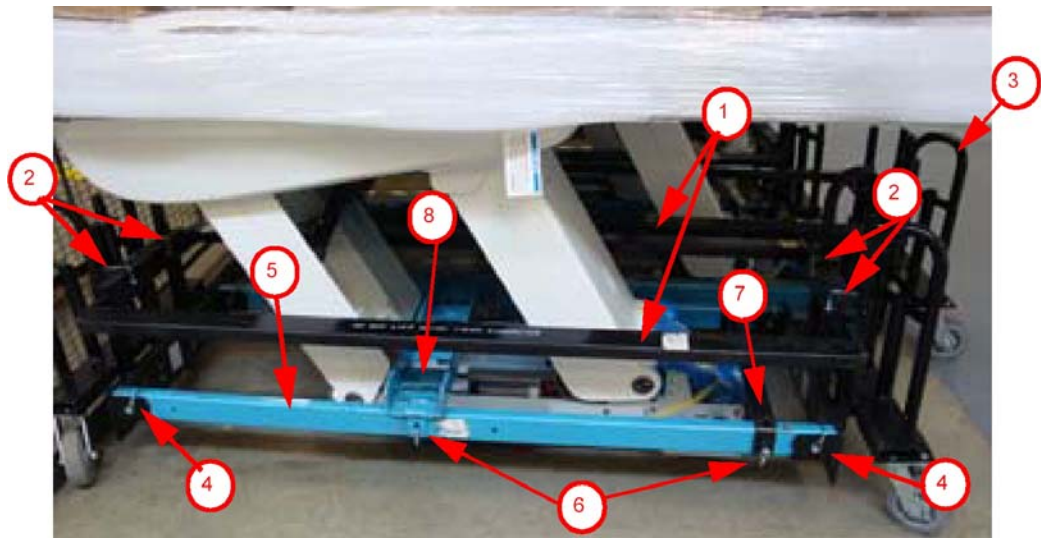


Figure 1-59 Table Shipping Dollies

| Item | Description |
|------|---|
| 1 | Side Rails (two rails, black, one each side) |
| 2 | Quick Release Pins (for side rails, two on each side) |
| 3 | Dolly Ends (two, one each end) |
| 4 | Quick Release Pins (for dolly ends, two each side) |
| 5 | Table Dolly Lifting Tube (two, blue, one each side) |
| 6 | Quick Release Pins (for dolly lifting tube, two each side) |
| 7 | Front Attachment Bar (black, one; 19 mm table base bolt located under the bar, not shown) |
| 8 | Back Attachment Bar (blue, one; see Figure 1-59) |
| 9 | Table Base Bolt (see Figure 1-59) |

Table 1-5 Description of Table Shipping Dollies

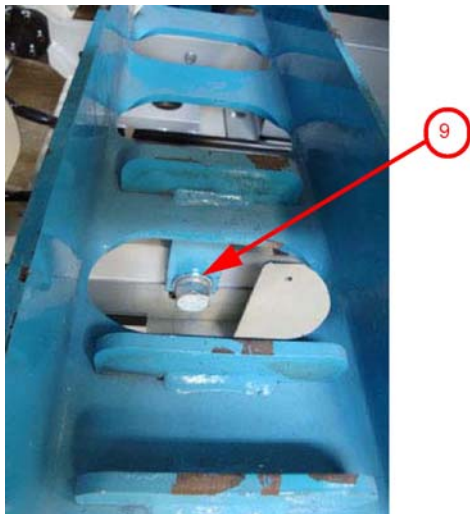


Figure 1-60 Close-up of table base connection

Section 12.0 Rear Entry Cable Box

A rear entry cable box (B7850RC) is used when the cables to the gantry cannot be brought up inside the gantry base. The box is not supplied with the system and must be ordered separately.

- 1.) Attach the rear entry cable box frame to the gantry base using four (4) screws that are shipped with the kit. See [Figure 1-61](#). The assembly can be made to fit floor entrance conduit or surface floor duct.

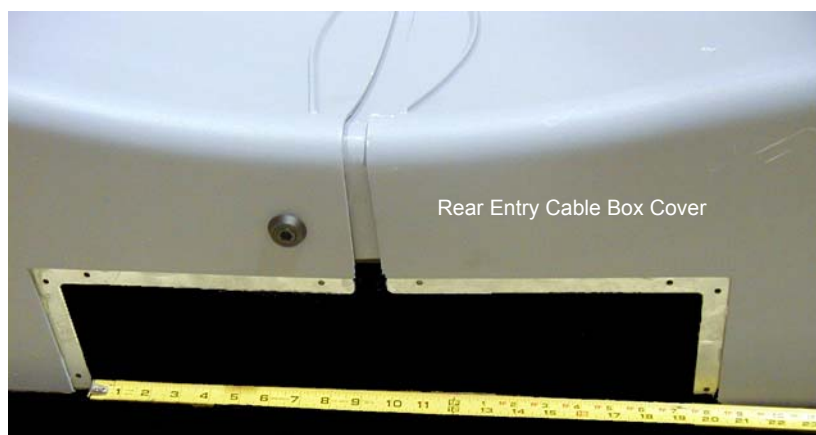
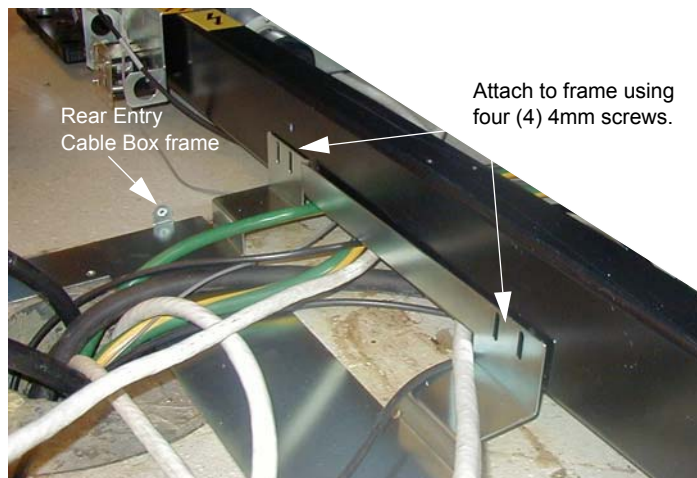


Figure 1-61 Rear Entry Cable Box

- 2.) There are three pairs of spacers shipped with this cover. Select the pair that is most appropriate for this site, based on the hardware.
 - Solid metal
 - Precut L-shaped metal
 - Solid plastic - Can be cut

12.1 Rear Entry with Surface Floor Duct

An OSHA ramp is required. The ramp must have 1' run of slope for each 1" rise in height.



Figure 1-62 OSHA Ramp Example

Section 13.0 Install Table Footswitch Assembly (GT1700V)

13.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|------------------------|--------------|
| 1 (FE or mechanical supplier) | | 1.0 hour labor on-site | |

13.2 Tools and Test Equipment

- Standard Install Tool Kit

13.3 Procedure

After table positioning is completed and the anchors are installed, install the footswitch assembly as shown in [Figure 1-63](#).

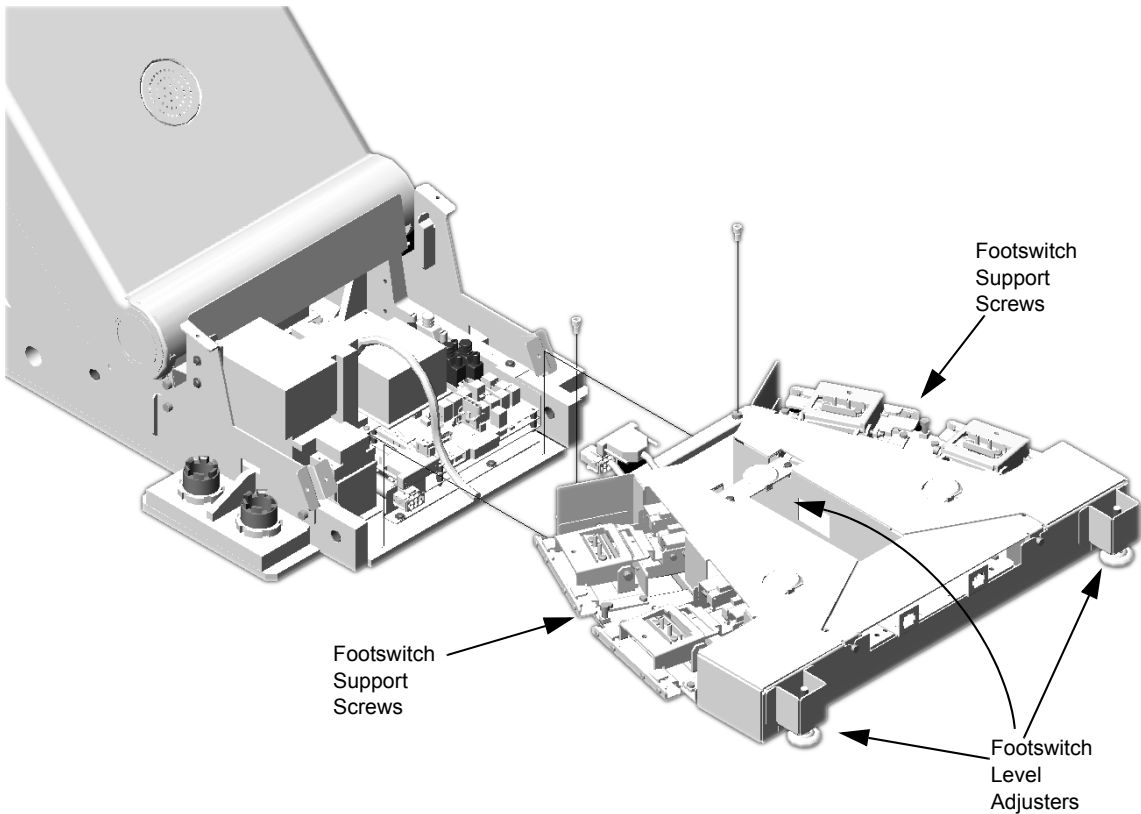


Figure 1-63 Footswitch Assembly Installation

- 1.) Pop off foot pedal screw cover tabs.
- 2.) Remove foot switch covers.
- 3.) Remove 3 Phillips screws that secure the assembly cover.

- 4.) Remove the footswitch assembly cover.
- 5.) Using two (2) M6 bolts, attach the footswitch assembly to the table base.

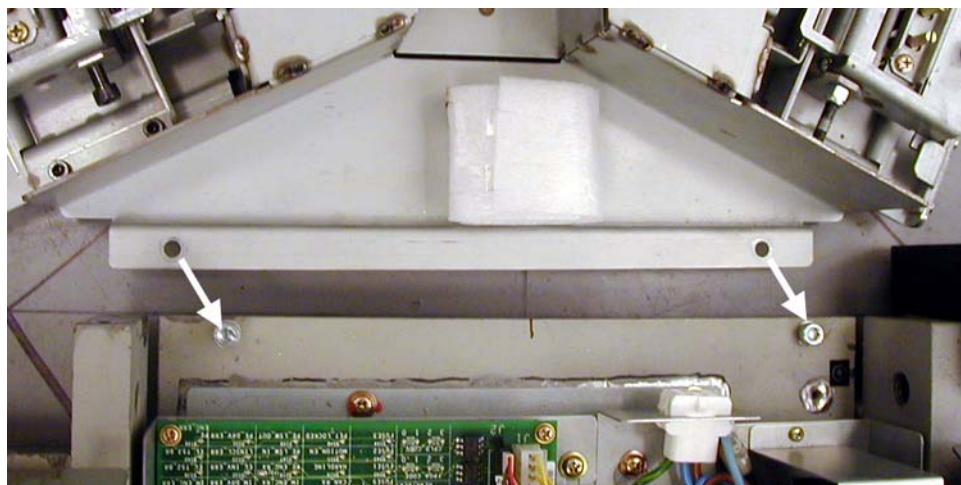
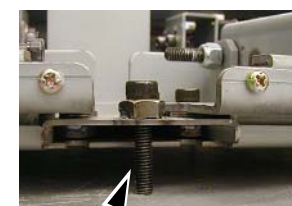
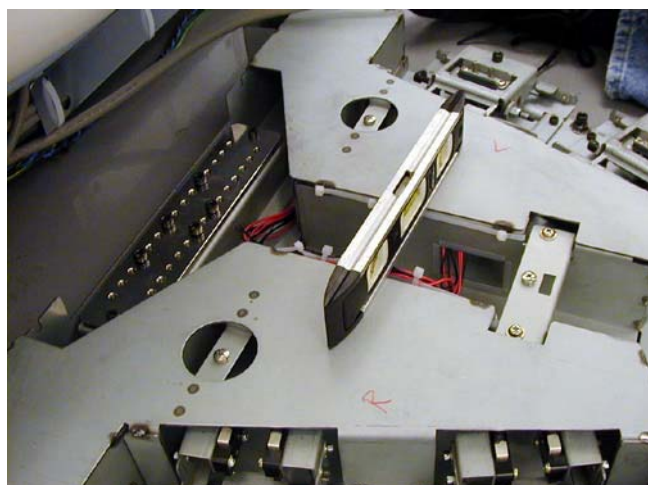
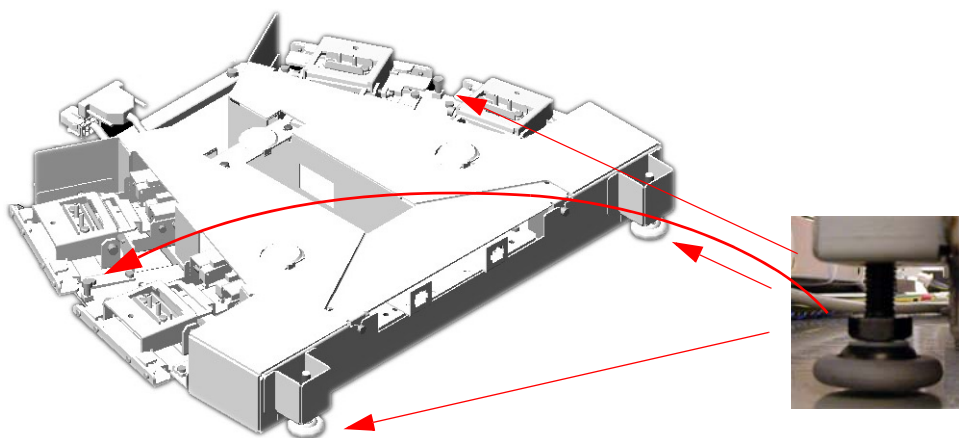


Figure 1-64 Attach Footswitch

- 6.) Level the footswitch assembly using the three (3) level adjusters. Two are on the gantry side and one is in the middle. Use a 9 in. level to check the levelness in all directions.



Footswitch support screw

Figure 1-65 Level Footswitch

- 7.) Cut the tie-wraps from around the cables in the gantry base and route the power cables from the gantry as shown in [Figure 1-66](#).

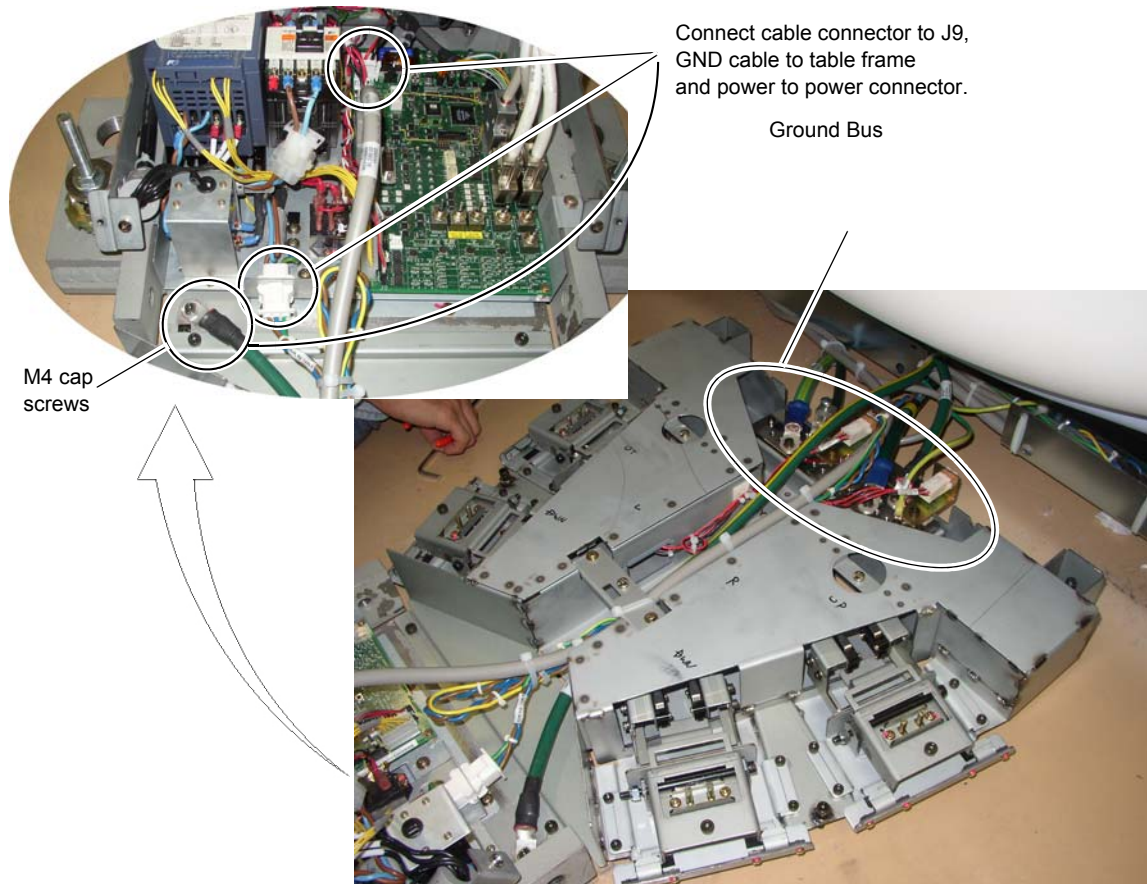


Figure 1-66 Footswitch Assembly Cable Wiring

- 8.) Connect the ground bus connector plate.

Note: Additional M6 Hex-screws may be required to connect grounds.

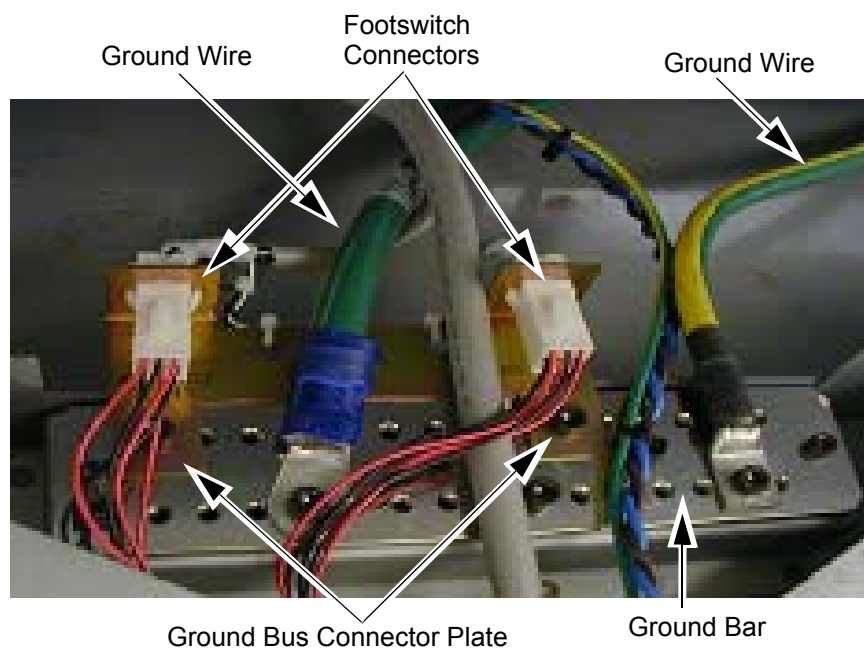


Figure 1-67 Footswitch Ground/Bus Bar

- 9.) Install the footswitch pedal bracket onto the installed ground bus bar.
Connect the ground wires (not all shown in [Figure 1-67](#)) to the installed ground bus:
Table#2
Gantry#1/0 and #10 and 2-#8 (Optional)
Console#2
PDU#1/0
- 10.) Torque per [Table 1-6](#).

| Wire Size AWG | Driver | Bolt/Hex |
|---------------|----------------------|---------------------|
| #14 - 8 | 1.67 ft-lb (2.3 N-m) | 6.25 (8.5 N-m) |
| #6 - 4 | 3.0 ft-lb (4.1 N-m) | 12.5 (17 N-m) |
| #3 - 1 | | 21 ft-lb (28.5 N-m) |
| #0 - 2/0 | | 29 ft-lb (39.3 N-m) |

Table 1-6 Ground Buss Bar Torque Values

- 11.) Install all footswitch covers after work is completed. See Section [1.7 Install Gantry Base Covers](#), on page [143](#).

Section 14.0 Install Table Footswitch Assembly (Lite Table)

14.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|------------------------|--------------|
| 1 (FE or mechanical supplier) | | 1.0 hour labor on-site | |

14.2 Tools and Test Equipment

- Standard Install Tool Kit

14.3 Procedure

Install the table foot-switch assembly as shown in [Figure 1-68](#), along with filler strip.

- 1.) Connect foot-switch cables.

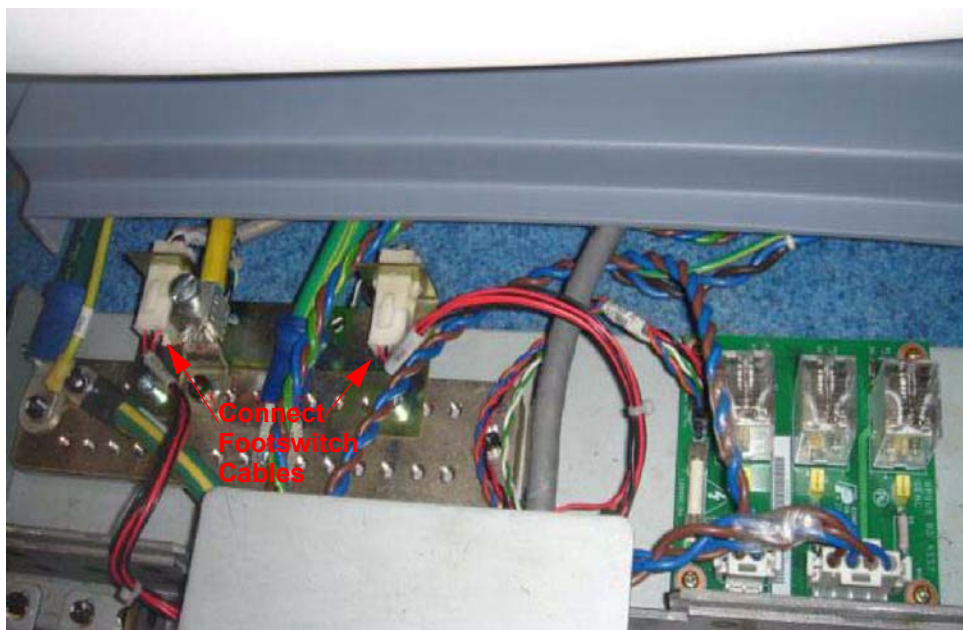


Figure 1-68 Install Table Foot-switch

- 2.) Install front bottom cover and footswitch pedals.



Figure 1-69 Install Front Bottom Cover



Figure 1-70 Install Footswitch Pedals

Section 15.0 Remove Gantry Tilt Bracket

15.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|---------------|--------------|
| 1 (FE or mechanical supplier) | | Labor on-site | |

15.2 Tools and Test Equipment

- 10 mm Hex wrench
- 14 mm Hex wrench

15.3 Procedure

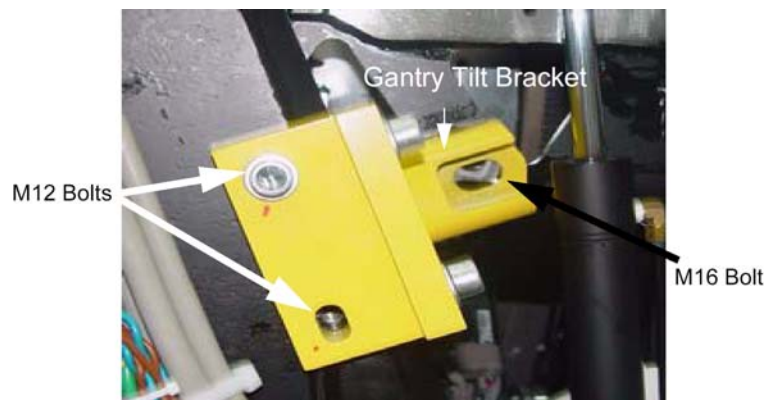


Figure 1-71 Gantry Tilt Bracket Removal

- 1.) Refer to [Figure 1-71](#). Remove the M12 bolts using a 10 mm Hex wrench.
- 2.) Loosen the M16 bolt 1-2 turns and check the Gantry tilt bracket, it should be loose to the touch. If loose continue with step 4.

CAUTION



Potential for personal injury.

If tilt bracket is not loose, stop and put the M12 bolts back in and tighten tilt bracket back in place. If there is a load on the tilt bracket, removal may cause the gantry to suddenly tilt all the way back due to a possible lack of hydraulic pressure.

- 3.) Check the hydraulic connections for leaks or lack of fluid. You will have to wait until the system can be energized to use the tilt controls to relieve the load on the tilt bracket prior to removal. Do not use force to remove the bracket.
- 4.) If the bracket feels loose, remove the M16 bolt using a 16 mm Hex wrench.
- 5.) Remove the bracket.
- 6.) Close the gantry covers and reinstall the scan window.
- 7.) Store brackets in the gantry base.

Section 16.0 Position the Power Distribution Unit



WARNING

LOCKOUT/TAGOUT IS REQUIRED BEFORE PERFORMING THIS TASK. USE THE SUPPLIED LOTO KIT.

ALL INSTALLATION WORK WITHIN THIS SECTION ON THE POWER DISTRIBUTION UNIT SHOULD BE COMPLETED BY A LICENSED ELECTRICIAN ONLY.

Note: Connecting the primary incoming power is performed by the customer's electrical contractor. The electrician needs to provide a reducing bushing to attach the flexible conduit to the PDU

16.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|------------------------|------------------|---------------|--------------|
| 1 Customer Electrician | | Labor on-site | |

16.2 Tools and Test Equipment

Hex wrench set

16.3 Procedure

- 1.) Roll the PDU into position on its permanently mounted casters. Leave at least 15.5 cm (6 in.) between the PDU and back wall to allow cooling air to circulate.

| Connection or Wall Box | AWG # | Connection From | Connection To PDU | Installed & Checked |
|------------------------|--------|-----------------|--|---------------------|
| TS1 | Note 1 | PDB-A | TS1-1 | |
| | Note 1 | PDB-B | TS1-2 | |
| | Note 1 | PDB-C | TS1-3 | |
| | #1/0 | GND | N/G (Do NOT connect anything to neutral point.) | |

Note 1 : Refer to Pre-Installation manual.

Table 1-7 Contractor Connections

| Wire Size AWG | Driver | Bolt/Hex |
|---------------|----------------------|---------------------|
| #18 - 16 | 1.67 ft-lb (2.3 N-m) | 6.25 (8.5 N-m) |
| #14 - 8 | 1.67 ft-lb (2.3 N-m) | 6.25 (8.5 N-m) |
| #6 - 4 | 3.0 ft-lb (4.1 N-m) | 12.5 (17 N-m) |
| #0 - 2/0 | N/A | 29 ft-lb (39.3 N-m) |

Table 1-8 Power Wire Torque Values

- 2.) Run the main input power conductors and ground through flexible metal conduit (attached between the PDU chassis and room duct-work) so you can move the PDU away from the wall during service.



Figure 1-72 Flexible Conduit for PDU Power

- 3.) Locate the hole cover plate in Box 1 and attach the flexible metal conduit to the PDU.
- 4.) If present, remove the TS1 panel front cover.
- 5.) Strip the wires to fit securely on the power block.
- 6.) Observe incoming phases (L1, L2, and L3) and insert bare leads into power block.
- 7.) Insert vault ground into PDU vault ground lug.
- 8.) Tighten all fasteners securely and replace the TS3 front panel.

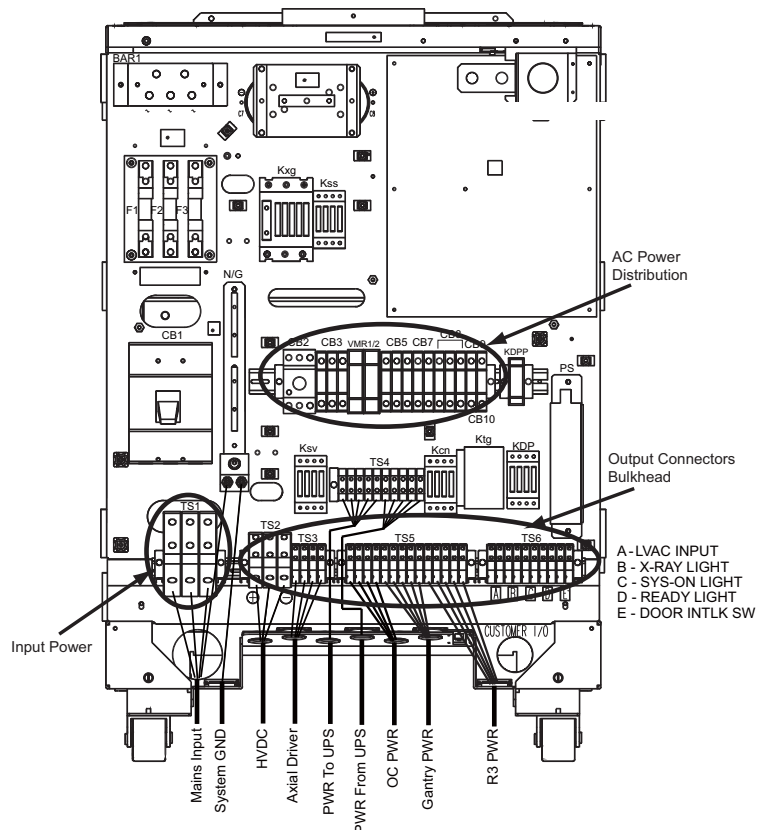


Figure 1-73 PDU Area Locations

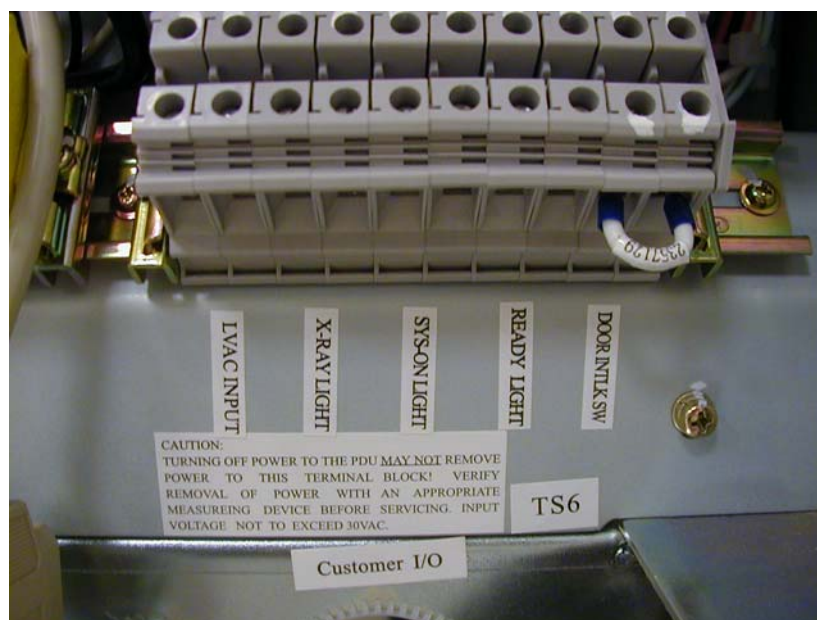


Figure 1-74 PDU Power Connections



WARNING



WORK WITH THE ELECTRICAL CONTRACTOR TO BE SURE EXTERNAL POWER SOURCE IS TURNED OFF.

| CONNECTION OR WALL BOX | AWG # | CONNECTION FROM | CONNECTION TO PDU | INSTALLED AND CHECKED |
|----------------------------|-------|-------------------|--|-----------------------|
| A1 | *1 | Load - T1 | TS-1 L1 | |
| | *1 | Load - T2 | TS-1 L2 | |
| | *1 | Load - T3 | TS-1 L3 | |
| | #1/0 | GND | TS-1 GND (Do NOT connect anything to neutral point.) | |
| WL (Warning light) | #14 | LV Source -1 | TS6 1 | |
| | #14 | LV Source -2 | TS6 2 | |
| | #14 | X-Ray ON Light -1 | TS6 3 | |
| | #14 | X-Ray ON Light -2 | TS6 4 | |
| | #14 | Sys-ON Light -1 | TS6 5 | |
| | #14 | Sys-ON Light -2 | TS6 6 | |
| | #14 | Ready Light -1 | TS6 7 | |
| | #14 | Ready Light -2 | TS6 8 | |
| DS (Scan Room Door Switch) | #14 | Door SW-1 | TS6 9 | |
| | #14 | Door SW-2 | TS6 10 | |

***1:** Sub-feeder wire size depends on system input voltage. Refer to Ch. 12 - Power Requirements in Pre-Installation manual.

Table 1-9 Contractor PDU Connections

Section 17.0 Install Operator Console

17.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|---------------|--------------|
| 1 (FE or mechanical supplier) | | Labor on-site | |

17.2 Tools and Test Equipment

Hex wrench set

17.3 Procedures

17.3.1 Install SWS table

- 1.) If your system has the SWS table, assemble SWS table. Refer to [Appendix C](#) for details of SWS Table assembly.
- 2.) Place the SWS table at one side of the console.

17.3.2 Peripherals Placement

- 1.) Place keyboard, GSCB
- 2.) Locate and unpack the Media tower.
- 3.) Place the Media tower on the SWS table.

Section 18.0 Seismic Mounting

Before proceeding with seismic mounting for any of the components in this section, be sure to allow sufficient space to unbolt and move the component from its mounted location for service.

- You may need to remove all four mounting bolts.
- If removing the component requires lifting, use an appropriate-sized pry bar to lift each corner of the component.
- Two installers may be required to safely complete this task.
- 5/8 in. anchor for IBC 2007 standards or as provided in the seismic kit.

18.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|---------------|--------------|
| 1 (FE or mechanical supplier) | | Labor on-site | |

18.2 Procedures

18.2.1 Console

If site specifications require seismic mounting, use M8 or 3/8" anchor bolts to mount the brackets to the floor. Refer to [Figure 1-75](#) for hole placement. The console seismic brackets are shipped with the console.

Note: If you use the front anchor holes as alternative anchor location, use the Drop-in type anchor.

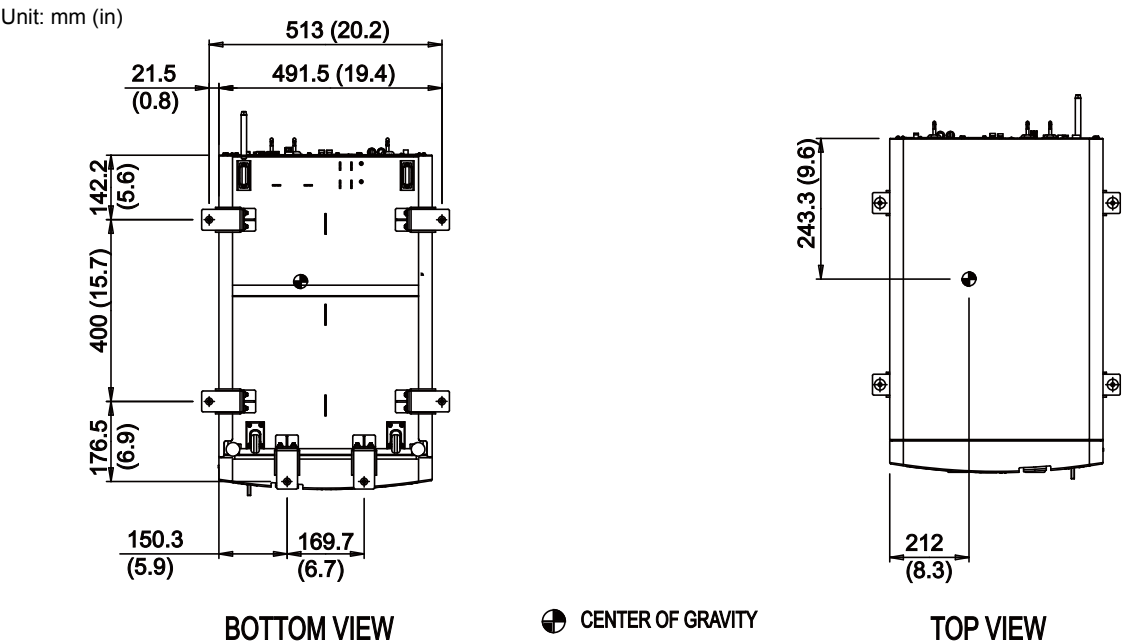


Figure 1-75 Seismic Console Mounting Hole Locations

18.2.2 Power Distribution Unit

CAUTION The PDU is very heavy and may present a crush hazard if proper precaution and tools are not used.

If site specifications require seismic mounting, use 5/8 in. (15mm) bolts, and the seismic brackets and anchors that shipped with the NGPDU. Refer to [Figure 1-76](#) for mounting hole locations, and mount the PDU so it can be easily removed for service.

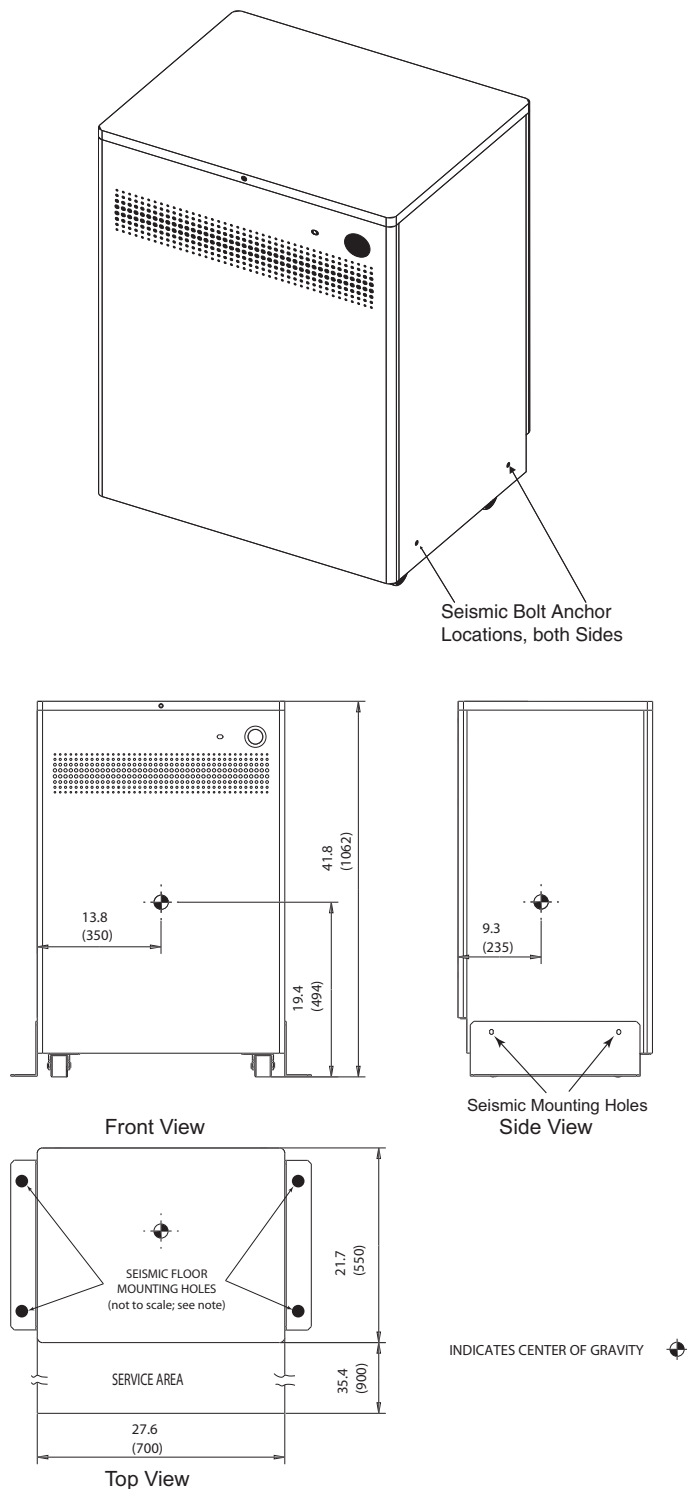


Figure 1-76 Seismic PDU Mounting Hole Locations

Chapter 2

Power, Ground & Interconnect Cables



NOTICE Potential for Data Loss and/or Equipment Damage

To prevent potential data loss and equipment damage, please do the following:

- Record data collected from procedures in this chapter into Form F4879 when directed.
- Only use the Installation manual that arrives with your system for installation. Any other revisions of this manual may not exactly match your system.

Section 1.0 Introduction

Site use of conduit, floor duct, wall duct, or a raised computer floor, as well as the individual component layout determines the system cable sequence. If your site has floor or wall ducts that will interfere with placement of the table/gantry, it may be important to have the movers unload the cable boxes (8 & 9) first and run those cables while others unload the subsystems.

- Try to run the system cables after the contractor completes the contractor supplied wiring.
- All ground wires and other contractor wiring should be complete to the point of equipment placement.



NOTICE Potential for Equipment Damage

1.1 Cable Storage

Do not store excess cable in the bottom of the PDU or Gantry.

Do not store excess cable behind or under the installed components (table, PDU, gantry or console). Check with the site electrical contractor, before hiding excess in conduits or cable ducts.

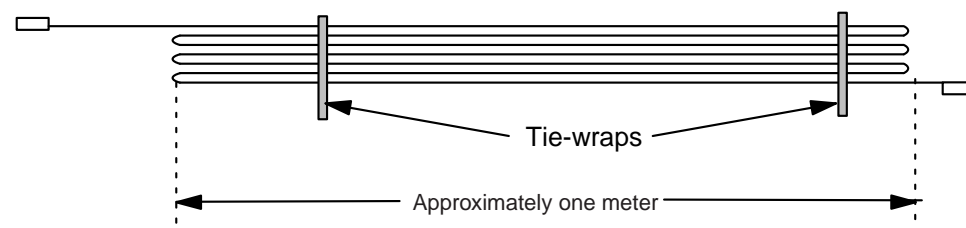


Figure 2-1 Excess Cable Storage Configuration

- Keep signal and control cables away from power cables and power wiring. When you lay cables in a raceway, locate the signal cables in a separate section of the raceway, or a separate conduit.
- Check all connections for tightness.
 - Use suitable tools and judgment.
 - Check all visible connections, especially ground connections.

- **Check for reasonable cable routing.**
 - Take into consideration necessary take-up distances for equipment maintenance, etc.
 - Try to complete as neat a job as possible.

1.2 System Component Identification

Identify all system cables by the system component designators listed in [Table 2-1](#). Each end of a system cable has a label, and may have a color near the connector, (refer to [Table 2-2](#)) to indicate the component and the jack identifier of the component. All cables are located on the lower right shelf of the lean cart.

| DESIGNATOR | SYSTEM COMPONENT |
|------------|--|
| CT2 | Gantry |
| CT1 | Patient Table |
| PDU | Power Distribution Unit |
| OC | Operator Console (Console Computer) |
| WL | X-Ray ON Warning Light |
| A1 | Primary Power Disconnect |
| SEO | System Emergency OFF |
| DS | Door Interlock Switch |
| BBNC | Broad-Band Network Connection |

Table 2-1 System Component Identifiers

1.3 Cable Color Identifiers

The ends of the cables may be marked with a piece of blue, yellow, red, or orange colored tape to help with the cable installation. [Table 2-2](#) lists the subcomponent, and corresponding color.

| SUBCOMPONENT | COLOR |
|------------------|--------|
| Gantry | Blue |
| Table | Yellow |
| PDU | Red |
| Console Computer | Orange |

Table 2-2 Cable Color Identifiers

| RUN NO. | DESCRIPTION | PART NUMBER | |
|---------|--------------------------------------|---------------------------------------|--------------------------------------|
| | | LONG CABLES (KIT P/N 5444556-2) | SHORT CABLES (KIT P/N 5444556) |
| 1 | Facility MDP to Room Disconnect (A1) | cust. supplied | cust. supplied |
| 2 | Room Disconnect (A1) to PDU | cust. supplied | cust. supplied |
| 3 | Room Disconnect (A1) to System E-Off | cust. supplied | cust. supplied |

Table 2-3 System Interconnect Cables

| RUN NO. | DESCRIPTION | PART NUMBER | |
|---------|--|---------------------------------------|--------------------------------------|
| | | LONG CABLES (KIT P/N 5444556-2) | SHORT CABLES (KIT P/N 5444556) |
| 4 | PDU to Room Warning Light(s) | cust. supplied | cust. supplied |
| 5 | PDU to Scan Room Door Switch | cust. supplied | cust. supplied |
| 50 | HVDC Power Cable - PDU to Gantry | 2343529 | 2343529-2 |
| 51 | HVAC Power Cable - PDU to Gantry | 2343530 | 2343530-2 |
| 52 | LVAC Power Cable - PDU to Gantry | 2343528-3 | 2343528-4 |
| 53 | LVAC Power Cable - PDU To Operator's Console | 2343531 | 2343531-2 |
| 54 | LVAC Power Cable - Gantry to Table | n/a | n/a |
| 55 | Ground, PDU to Raceway | 2371450 | 2371450-2 |
| 56 | Ground, Raceway to Console | 2371450-3 | 2371450-4 |
| 60 | LVAC Power Cable - PDU to Optional UPS | - | - |
| 61 | LVAC Power Cable - UPS Disconnect Panel to PDU | - | - |
| 90 | LVAC Power Cable - PDU to PET | - | - |
| 100 | Signal Cable - Gantry to PDU | 5419992 | 5419992-2 |
| 101 | Signal Cable - Gantry to Console | 5419981 | 5419981-2 |
| 102 | Signal Cable (Ethernet) - Gantry to Console | 5454760-2 | 5454760 |
| 103 | Data Cable (Fiber Optic) - Gantry to Console | 5478856 | 5478856-2 |
| 104 | Signal Cable - Gantry to Table | n/a | n/a |
| 110 | Signal Cable - UPS Control to Room Disconnect (A1) | - | - |
| 111 | Signal Cable - UPS Control to UPS Disconnect Panel | - | - |

Table 2-3 System Interconnect Cables (Continued)

NOTICE



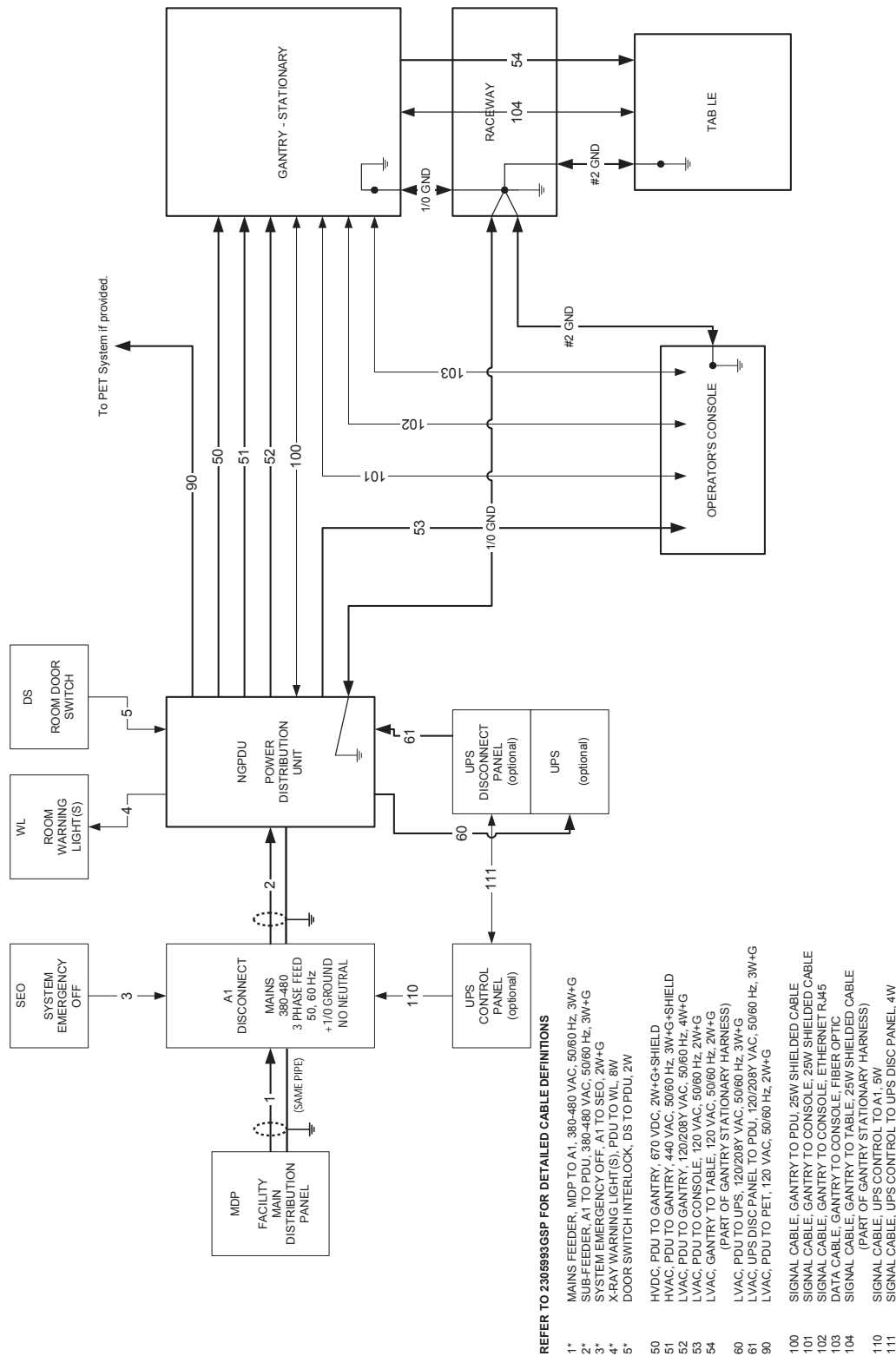
Shortening power cables is not allowed. The crimping tool and ferrules are not shipped with the system.

If longer or shorter cables are required, order the correct set.

Excess cables cannot be stored under or behind the PDU, gantry or console.

Section 2.0 System Interconnect Diagram

Figure 2-2 System Interconnect Diagram



Section 3.0 Console Connections

3.1 GSCB, Keyboard & Mouse Installation

| PART # | DESCRIPTION | CONNECT TO | QTY | LENGTH | |
|-----------|---|--|-----|---------------|-----------|
| | | | | INCHES | MM |
| 5366514-2 | USB EXTENSION CABLE | Keyboard | 1 | 140.16 ± 1.18 | 3560 ± 30 |
| 5366514 | USB EXTENSION CABLE | Mouse | 1 | 118.11 ± 1.18 | 3000 ± 30 |
| 5332107-2 | CABLE, DVI to D-SUB VIDEO CABLE | Monitor | 1 | 118.11 ± 0.79 | 3000 ± 20 |
| 5315370 | CABLE, USB TYPE A-B | PMT media Tower, DVD-RW/USB external HDD | 2 | 78.74 | 2000 |
| 5408703 | DP to DVI cable, 3 meter | Monitor | 1 | 118.11 ± 1.97 | 3000 ± 50 |
| 5432953-2 | Power Cable, Peripheral Tower to NIO AC Box | PMT Media Tower | 1 | 120 ± 1.97 | 3050 ± 50 |
| 5432953-3 | Power Cable, Display Monitor to NIO AC Box | Display Monitor | 1 | 120 ± 1.97 | 3050 ± 50 |
| 5432953-4 | Power Cable, Scan Monitor to NIO AC Box | Scan Monitor | 1 | 120 ± 1.97 | 3050 ± 50 |

Table 2-4 GE Healthcare Supplied NIO64 Console Cables

- 1.) Route the keyboard cable under the GSCB, as shown in [Figure 2-3](#).



Figure 2-3 GSCB connected to the keyboard

NOTICE



Potential for equipment damage

Never connect a mouse or keyboard with the host computer powered “ON”. Doing so can destroy components within the host computer.

- 2.) Route the keyboard and mouse cables to NIO64 console.
- NOTICE** NIO64 has long cable kit option (5456816)
Refer to the instruction, NIO Console Long Cable Kit Installation manual.
- 3.) Select the GSCB overlay (with both Tilt and E-Reset, P/N is 5401237-XXX) install the proper overlay with the appropriate language for the system.
Verify that none of the buttons get caught and stuck under the overlay. Pay close attention to the prescribed tilt button on systems with the tilt feature.
- Note: X-ray ON sound can be turned off / on using the switch on GSCB bottom if customer does not like it and if local regulation does not require X-ray ON sound. Detail information refer to **Service Methods->Troubleshooting->Console-> GSCB Troubleshooting.**
- 4.) The keyboard should attach to the GSCB using the supplied Velcro strip and fit snugly against the GSCB when finished, as shown in [Figure 2-3](#).
- 5.) Route the GSCB cable and connect connectors according to [Figure 2-4](#) and [Table 2-5](#)
- Note: The USB cable of GSCB is reserved, please tie it with tie-wrap.



Figure 2-4 GSCB and Cable

| DESCRIPTION | PART NUMBER | FROM | TO |
|-------------|-------------|------|---|
| GSCB Cable | 5404262 | GSCB | DB25/M Black - OC Control Cable RL (5432021-2) DB9/M Black - AC Box J56 USB - Reserved Voice Blue - Host Computer Audio In Voice Green - Host Computer Audio Out DB9/F Gray - Host Computer RS232 DB9/F Black - Host Computer DIP |

Table 2-5 GSCB Cable

3.2 Connecting the Media Tower (5270510-20)

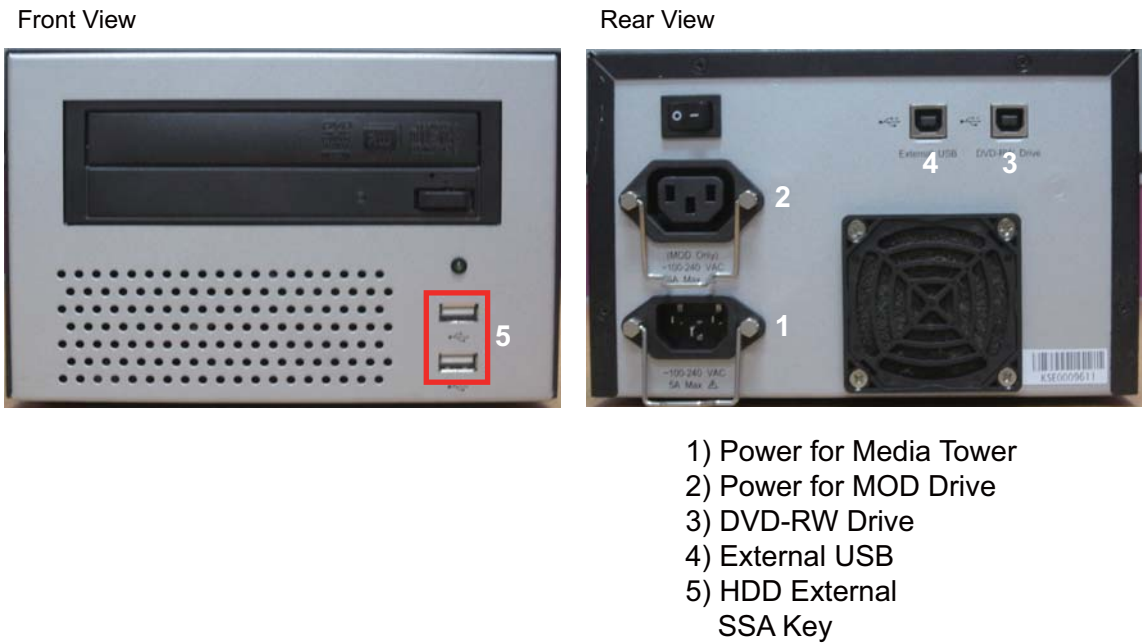



Figure 2-5 Media Tower Connection shown (Single Bay)

Connect the power cable to the rear of the media tower. Use the following cables for connection.

| DESCRIPTION | PART NUMBER | CABLE LENGTH | QTY |
|---|-------------|--------------|-----|
| USB Cable (PMT) | 5315370 | 2000 mm | 2 |
| Power Cable, Peripheral Tower to NIO AC Box | 5432953-2 | 3050 mm | 1 |

Table 2-6 Media Tower Cables

3.3 Connecting the LCD Monitor



NOTICE **Equipment Damage Possible**

Do not touch the video signal cable connector pins as this might bend them. When connecting the video signal cable, check the alignment of the HD15 connector. Do not force the connector in the wrong way, otherwise the pins might bend.

3.3.1 **Connect Scan Monitor and Image Monitor as following:**

Scan Monitor

- Video cable from Console Host DP0 to Monitor DVI
- Power cable from Console J10
- Route through the cable keeper



Figure 2-6 Video Cable and Power Cable

Display (Image) Monitor

- Video cable from Console Host DVI-I 0 to Monitor D-SUB
- Power cable from Console J9
- Route through the cable keeper



Figure 2-7 Video Cable and Power Cable

| DESCRIPTION | PART NUMBER | CABLE LENGTH | QTY |
|-----------------------------|-------------|--------------|-----|
| Scan Monitor Power Cable | 5432953-4 | 3050 mm | 1 |
| Scan Monitor Video Cable | 5408703 | 3000 mm | 1 |
| Display Monitor Power Cable | 5432953-3 | 3050 mm | 1 |
| Display Monitor Video Cable | 5332107-2 | 3000 mm | 1 |

Table 2-7 Monitor Cables

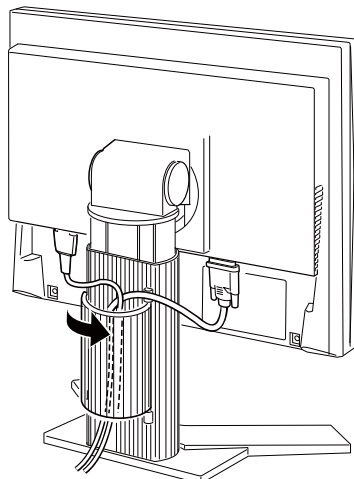


Figure 2-8 Cable Routing and Keeper

3.3.2 LCD Video Monitor Setup

Detail LCD video monitor setup please refer to **Service Methods** → **Align, Setup, Cals** → **Console** → **LCD Video Monitor Setup**.

3.4 Host Computer Connections

NOTICE

Potential for equipment damage Never connect a mouse or keyboard with the host computer powered "ON". Doing so can destroy components within the host computer.



- 1.) Open the right side of the console rear panel.

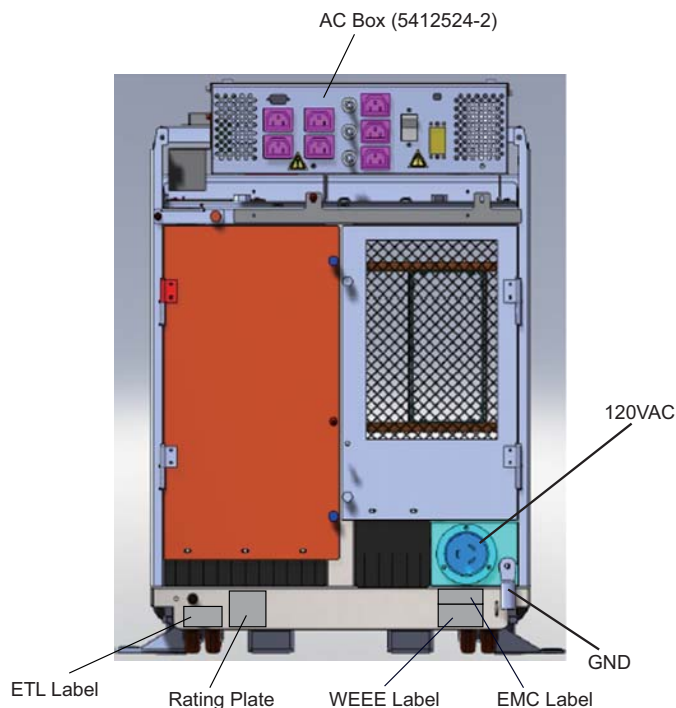


Figure 2-9 NIO Rear View

2.) Connect the all cables (see Table 2-4) to the rear of Host Computer referring to the drawing below (Figure 2-10).The drawing is also printed on the right rear door of the console.

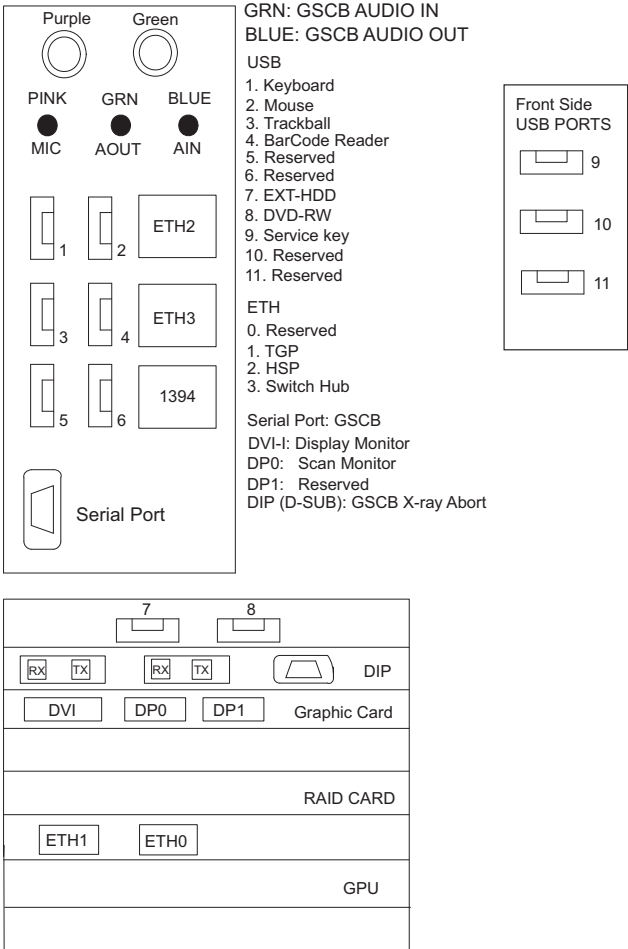


Figure 2-10 Host Computer Connections

3.5 Switch Hub Connections

Switch Hub located on the left bottom of the console. Plug cables into Switch Hub on console.

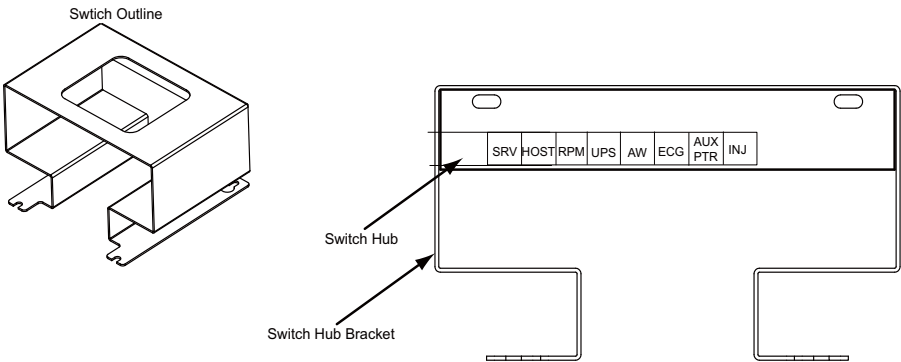


Figure 2-11 Switch Hub Connections

3.6 AC Box Connections

CAUTION The outlets are not for General Use. Operator Console outlet has a rating for 2.5A at 120VAC. Accessories should not exceed above rating.

Note: Console power is single phase power. Outlet assigned is not critical.

- 1.) Connect the console power cable and ground cable to the console power panel.
- 2.) Connect console component power cords as listed in [Table 2-8](#). ("J numbers" increment from top to bottom, left to right)

| Number | Description |
|--------|---|
| J9 | Display Monitor Power Connection |
| J10 | Scan Monitor Power Connection |
| J11 | Peripheral Media Tower Power Connection |
| J12 | In-Room Monitor Connection |
| J13 | Injector Power Connection |
| J14 | RPM Power Connection |
| J56 | GSCB Power Connection |

Table 2-8 AC Box Outlet Assignments

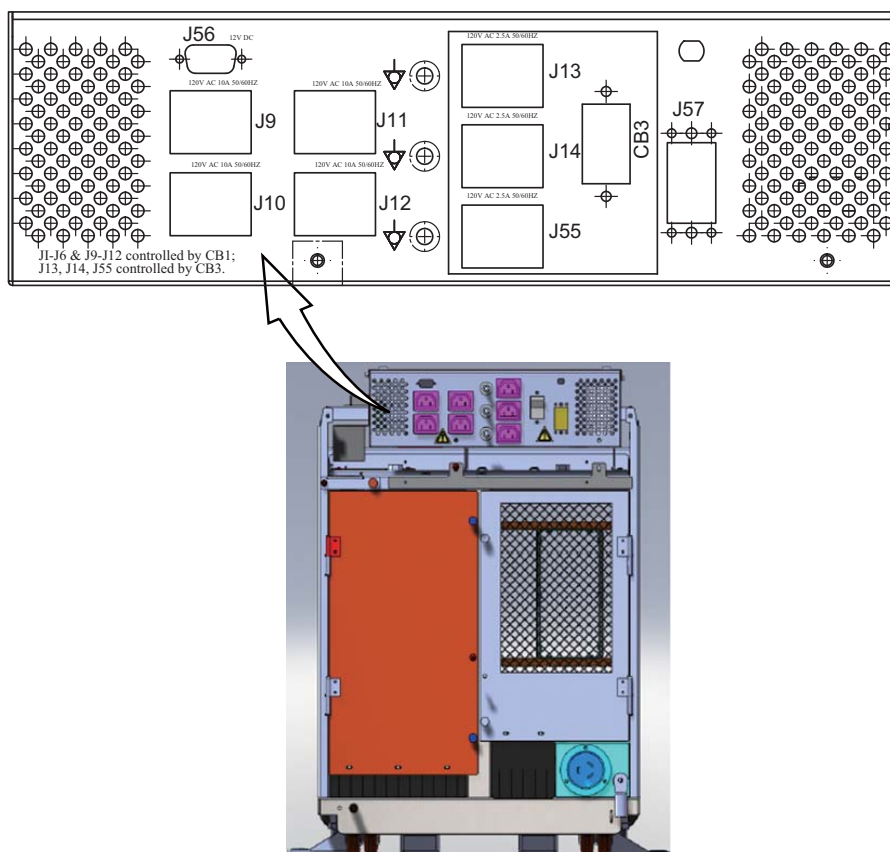


Figure 2-12 AC Box Connections

3.7 Cable Arrangement

Arrange the cables appropriately by using the cable clamps equipped on the console tables.

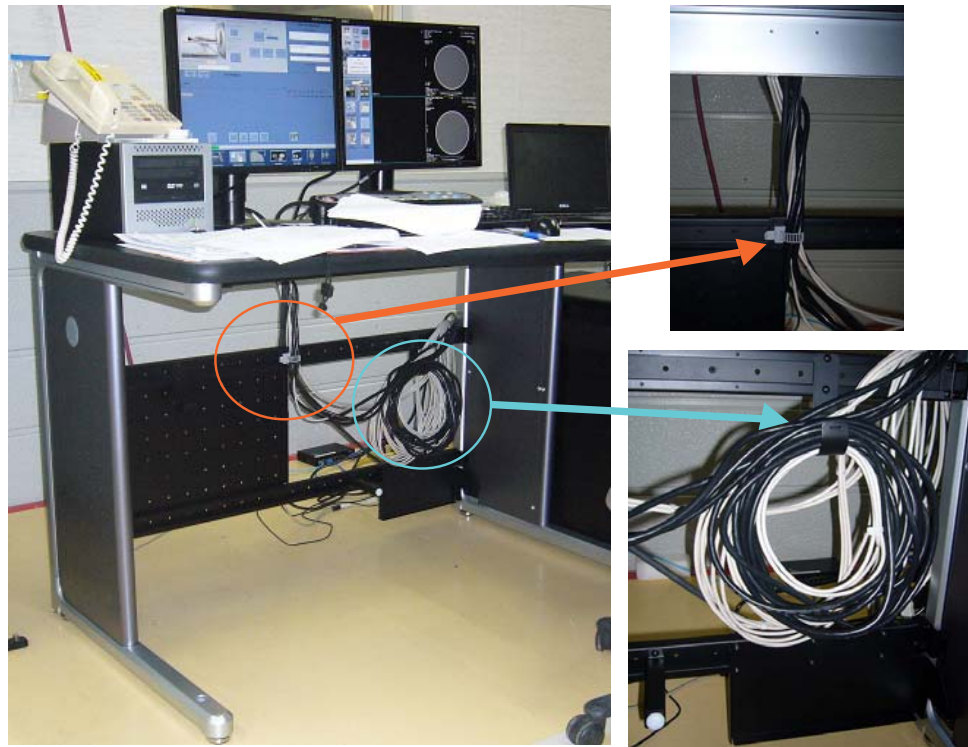


Figure 2-13 Example: Cable Arrangement

Section 4.0 Install Options

Note: Most shipped options can be located on the lean cart. Only large options such as the UPS and Smart Step will arrive on its own skid.

4.1 Install USB Barcode Reader

- 1.) Locate the barcode reader box on the lean cart options section.
- 2.) Consoles with 4 USB ports.
- 3.) Connect the USB cable to port USB A on the back of the console.
- 4.) Dress any excess cable and place under the monitor desktop.

4.2 Install Optional Remote Monitor

Follow the installation procedures in the Remote Monitor box.
For console wiring, refer to [Appendix D](#) in this manual.

4.3 Install Accessory I/F Hardware (IPC) Option

Follow the instructions shipped with the option.

Note: 8-port Ethernet switch is pre-installed on Optima CT680 Gantry. Ignore the section of LAN Switch installation in the option installation manual.

4.4 Install Respiratory Gating Option

Follow the instructions shipped with the option. The options board should be only mounted on the non-motor side of the gantry. Neatly dress all cables along the gantry base so that the base covers fit properly.

4.5 Install Injector Option

Follow the instructions shipped with the option. If this is a ceiling-mounted option, check that the plate is installed correctly with the holes in the correct location.

Mavig ceiling mounting plate. Customer installs this plate.



Mavig safety chain bracket.

4.6 Install Cardiac Gating IVY Monitor and Stand Option

Follow the instructions shipped with the Monitor and stand kit. Review the instructions carefully before assembling the stand and accessory basket to avoid repeated steps. Connect to the option interface panel, See Chapter 2 Section [5.2](#).

4.7 Customer Accessories - Head Holders and Extender

Open the boxes and installed the appropriate language warning labels.

The head holders are shipped with shims that require installation to ensure proper fit. Check that shims are included. Follow the shim procedure in Chapter 3, Section 3. The holder should fit snugly.

4.8 UPS Installation

If the site has an Uninterruptible Power Supply (UPS), please refer to UPS Installation for Direction *5174051-100 for Powerware 9155 UPS*. This manual should be shipped with the UPS. Use caution when removing the UPS from the skid. The UPS weight is 170kg (375lb).

4.9 Flat Tabletop used with Respiratory Gating

Follow the installation instructions with the Option.

4.10 SmartStep Installation

Follow the instruction shipped with option.

For the installation of the additional Gantry hardware (e.g. Gantry accessory panels and cables), refer to Accessory I/F Hardware option installation manual (5317058-1EN).

Section 5.0 Gantry Cable Connections

5.1 Gantry Cable Connections

Please refer to [Figure 2-2](#) for complete system interconnect details.

| TO | FROM | CABLE DESCRIPTION |
|------------------|---------|---|
| Gantry Power Pan | PDU | HVDC |
| Gantry Power Pan | PDU | 440VAC |
| Gantry Power Pan | PDU | 120VAC |
| Gantry Power Pan | Console | Fiber - <i>Take extreme care when you install the fiber optic DAS data cable. Do not step on, kink, or sharply bend this fragile DAS cable.</i> |
| Gantry Power Pan | Console | LAN |
| TGPG (J9) | Console | Control |
| TGPG (J11) | PDU | Control |

Table 2-9 Gantry Cable Connections

NOTICE



- 1.) If using a rear cable entry box (B7850RC), install it now, before routing cables to gantry.

Potential for equipment damage.

Observe correct polarity when connecting the high voltage DC power. Reversing these leads will result in serious equipment damage. The HVDC positive conductors have red insulation and are labeled “ONE.” The HVDC negative conductors have black insulation and are labeled “TWO.” Lead “ONE” must be connected to lead “ONE,” and lead “TWO” must be connected to lead “TWO.”

Observe correct phase rotation when connecting the axial motor power. Phases one, two and three should be connected top to bottom.

- 2.) Install the cables to the gantry power pan. The power pan is located on the rear of the gantry at its base. See [Figure 2-14](#), [Figure 2-15](#), and [Figure 2-15](#) for connections.

Note: The gantry 120VAC cable may not fit under the gantry frame. Install this cable before gantry placement—or remove the power plug—to route it under the gantry.

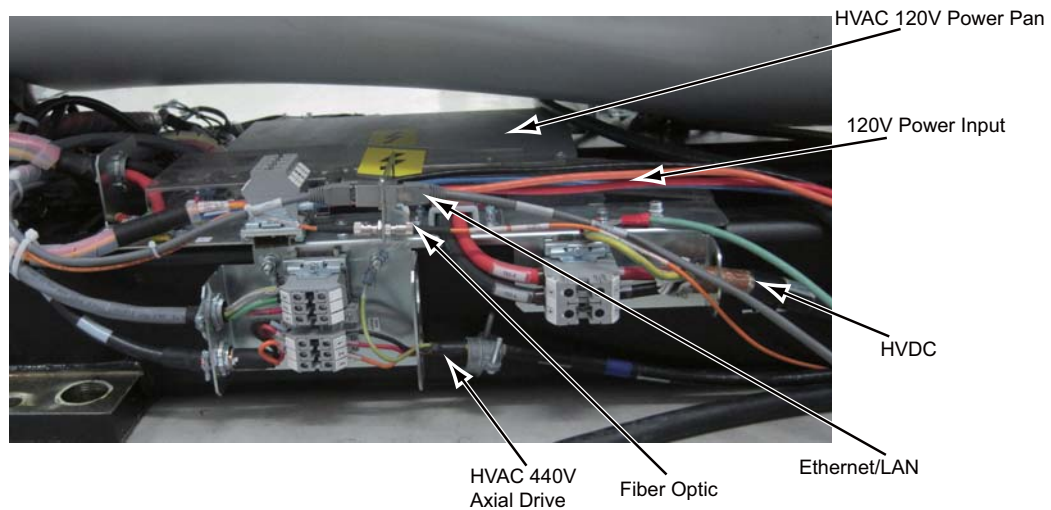


Figure 2-14 Gantry Power Pan Connections

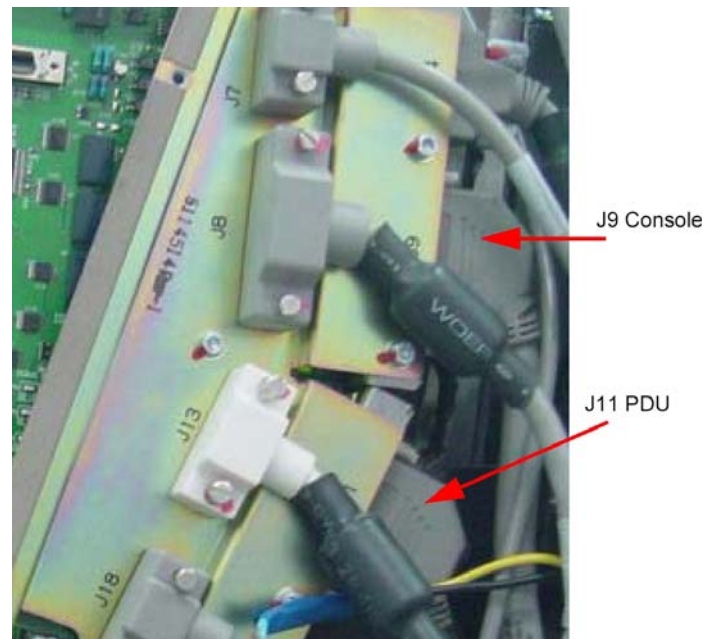


Figure 2-15 TGPG Connections

- 3.) Install cables to the gantry TGPG.
- Note: 4.) Route J9 and J11 cables behind all cables at this area. See [Figure 2-16](#).

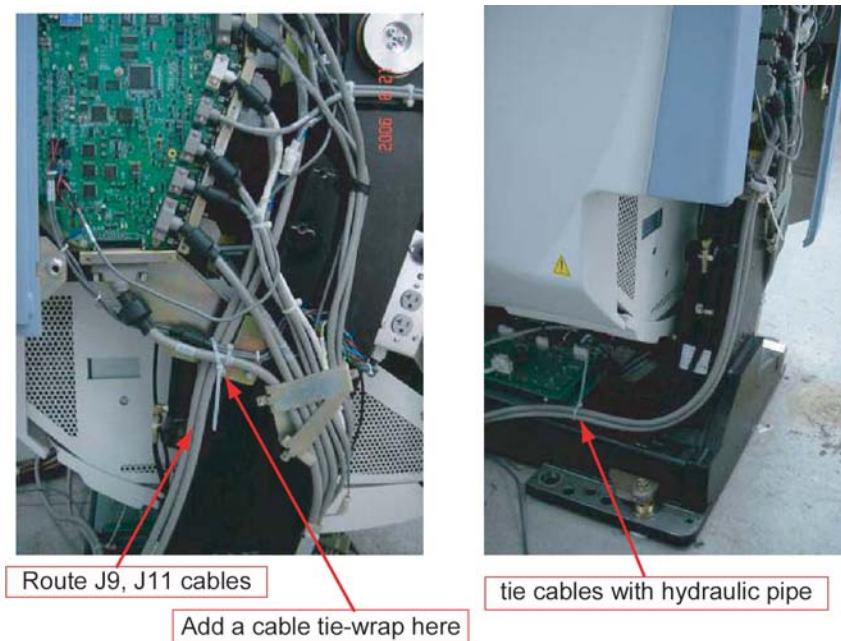


Figure 2-16 Route Cables

5.2 Cardiac Monitor Setup

Note: The following procedure is applied only if the Accessory I/F Hardware (IPC) Option is installed.

- 1.) Follow install instructions shipped with monitor to set up the monitor stand with basket.
- 2.) After the stand is assembled, mount the monitor to the stand by sliding the monitor onto the plate.
- 3.) Pull down the front pin on plate and slide monitor until it snaps into place.
- 4.) Secure the monitor using the two nylon set screws under the plate.
- 5.) Connect the long CAT5 LAN cable between back side of Gantry option interface and Console EKG port.
The long CAT5 cable is included in IVY Monitor kit.
- 6.) Attach the cables. *Do not use the cables shipped with the monitor*, find the 5317480 cable included with the Cardiac Cable Kit (E8007TB).

CAUTION The outlets are not for General Use. Gantry outlets have a rating for 3.0A at 120VAC. Accessories should not exceed above rating.

- 7.) Connect the IEC power cord, ground wire, LEMO and CAT5 to the gantry option interface panel. (See [Figure 2-17](#)).

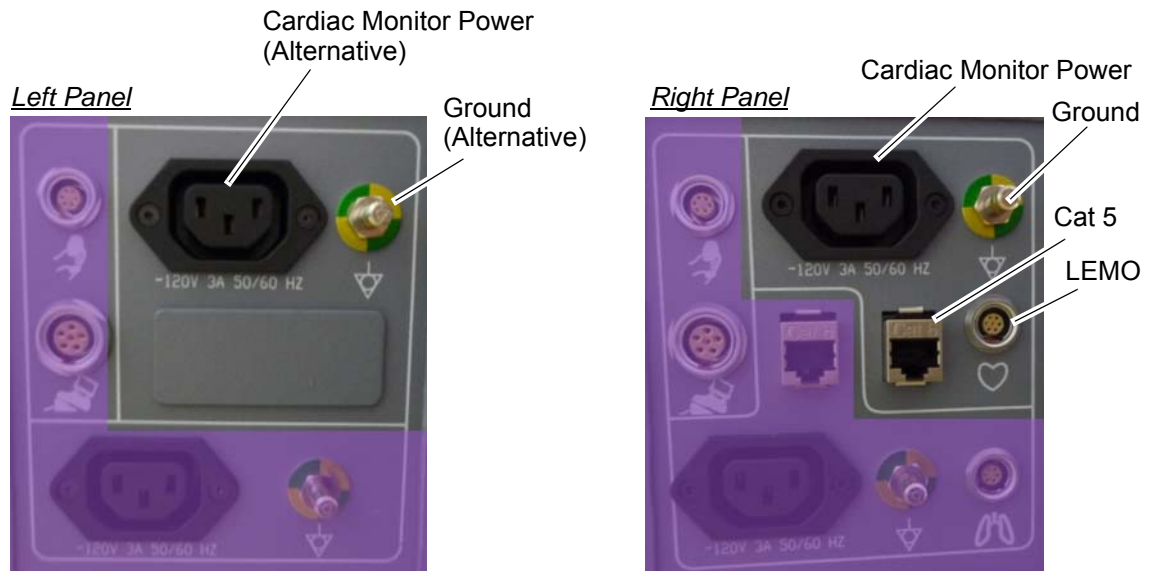


Figure 2-17 Gantry Option Interface Panel



Figure 2-18 Connections on Rear of Cardiac Monitor (IVY3150)

Ground
Wire



Figure 2-19 Connections on Rear of Cardiac Monitor (IVY7800)

- 8.) Connect the power cord, ground wire, HD15 and CAT5 to the monitor panel.(See [Figure 2-18](#)).
- 9.) The cardiac monitor receives power from the gantry.
- 10.) Strain relief the cables to the monitor stand, and to the gantry base covers using tie-wraps. (See [Figure 2-20](#)).

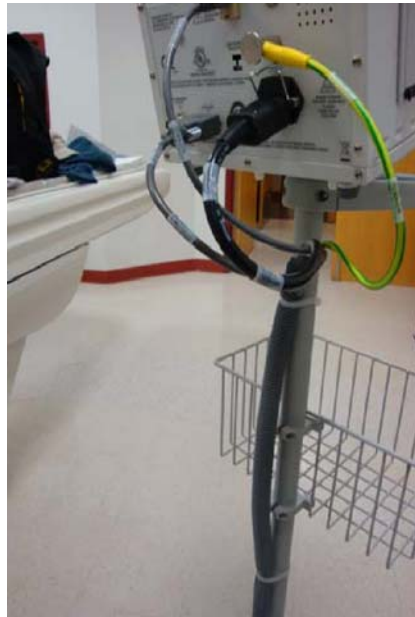


Figure 2-20 Cables Strain Relieved to Stand

5.3 Respiratory Monitor Setup (Version 1.7)

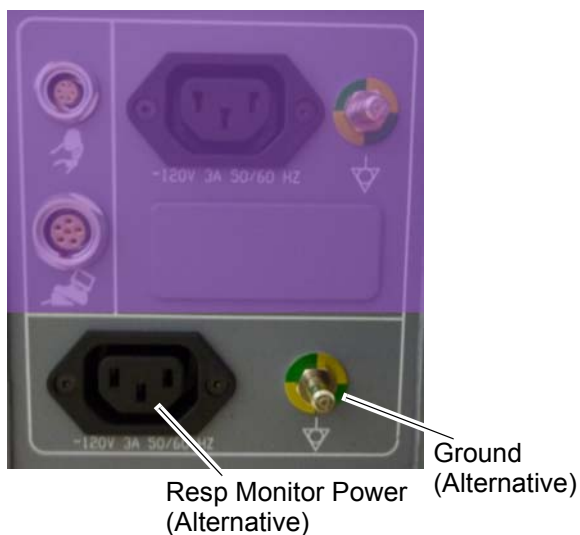
Note: The following procedure is applied only if the Accessory I/F Hardware (IPC) Option is installed.

Note: Installation of the Respiratory Monitor is done by Varian Service.

CAUTION The outlets are not for General Use. Gantry outlets have a rating for 3.0A at 120VAC. Accessories should not exceed above rating.

- 1.) Power outlet, ground and LEMO connector for the Respiratory Monitor are provided as shown in [Figure 2-21](#).

Left Panel



Right Panel

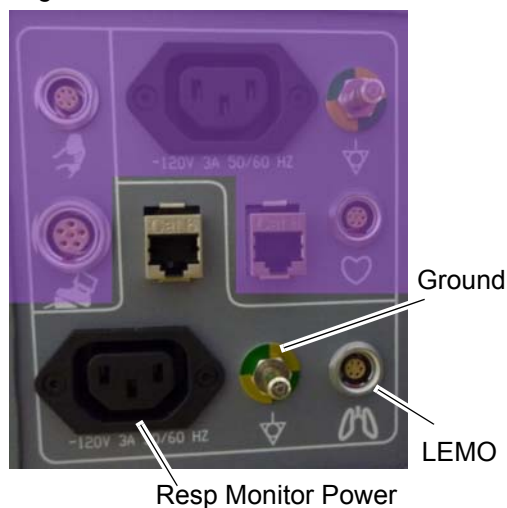


Figure 2-21 Option Interface Panel

Section 6.0 Table Connections (GT1700V)

Pull and connect the cables as described in Table 2-10. The table cables are bundled with the gantry frame. Cut the cable ties to release bundles of cables.

Note: The footswitch connector and wiring harness may be run and secured to the ground bar assembly.

| TABLE | FROM | CABLE DESCRIPTION |
|------------------|--------|-------------------|
| J1 table power | Gantry | 120 VAC |
| J9 table control | Gantry | Signal Cable |
| Table ground | Gantry | Table ground |

Table 2-10 Table Cable Connections

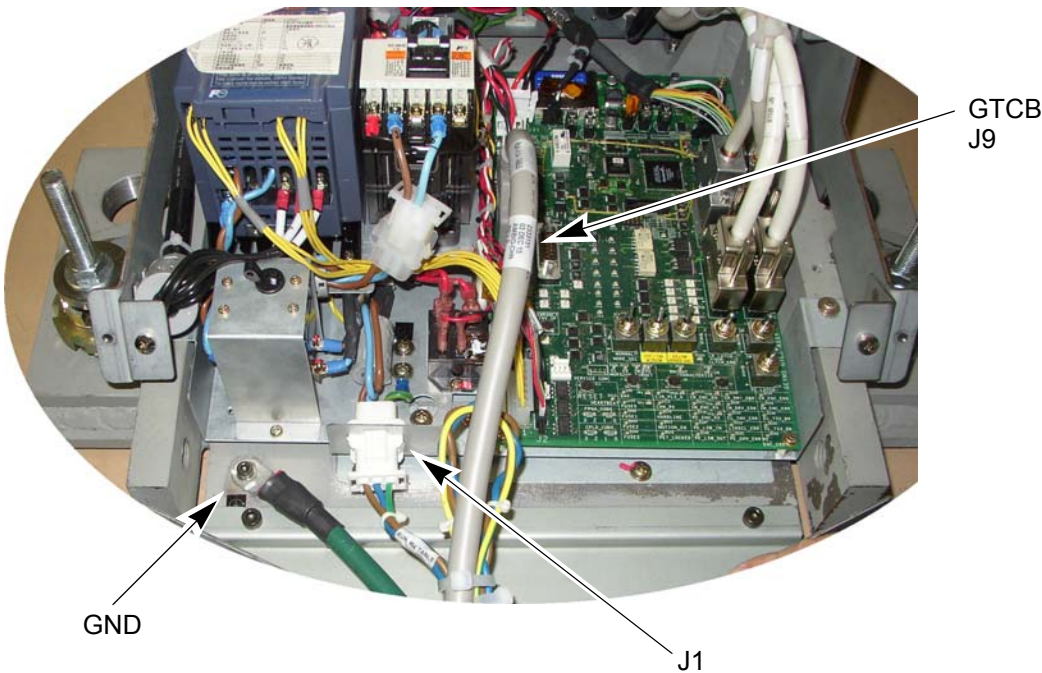


Figure 2-22 Table Connections

Note: You need to add the table ground cable and the footswitch adapter plate to ground bar, as shown.

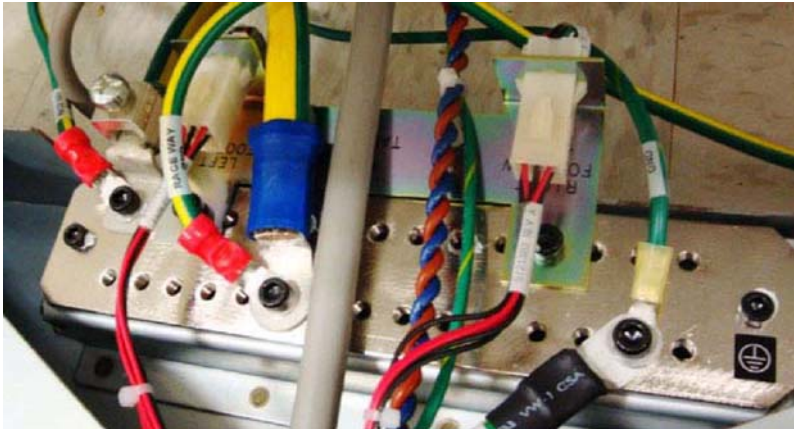


Figure 2-23 Finished Ground Bar Connections

Section 7.0 Table Connections (Lite Table)

Pull and connect the following cables:

| J# | CABLE DESCRIPTION |
|----|-------------------|
| J1 | 120 VAC |
| J9 | Signal Cable |

Table 2-11 Cables Connected to Table

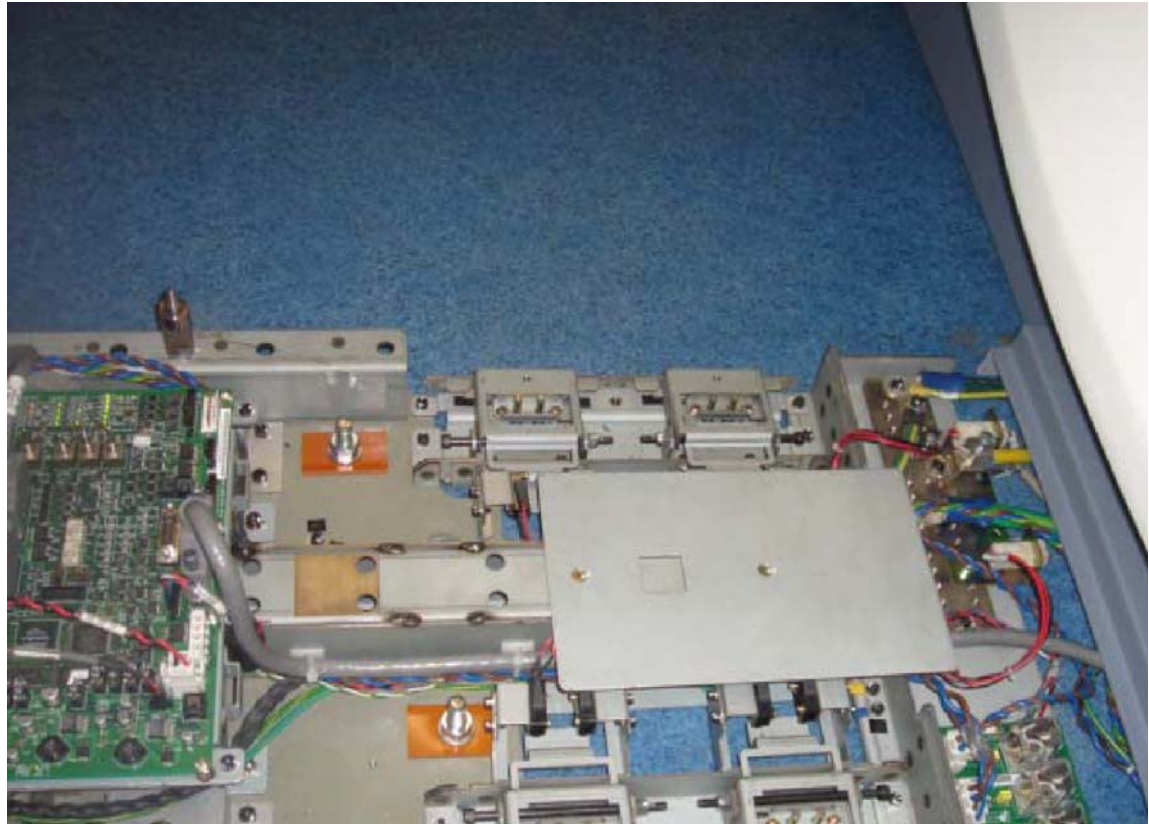



Figure 2-24 Table Bulkhead Connections

Section 8.0

PDU Cable Connections & Configuration



CAUTION Do not work in an energized PDU. When working on the PDU, follow this simple rule: Always tag and lock out power to the PDU at the “main” disconnect. Failure to do so can result in electrocution or death.

Do NOT apply power to the PDU until all work has been completed and all PDU covers are in their proper place.

8.1 Introduction to NGPDU

As seen in [Figure 2-25](#), a number of cables must be installed throughout the PDU. Specific details on each connection can be found in the sub-sections that follow. Use [Figure 2-25](#) for reference. The PDU has been designed to have cables routed into the PDU from behind and/or beneath it.

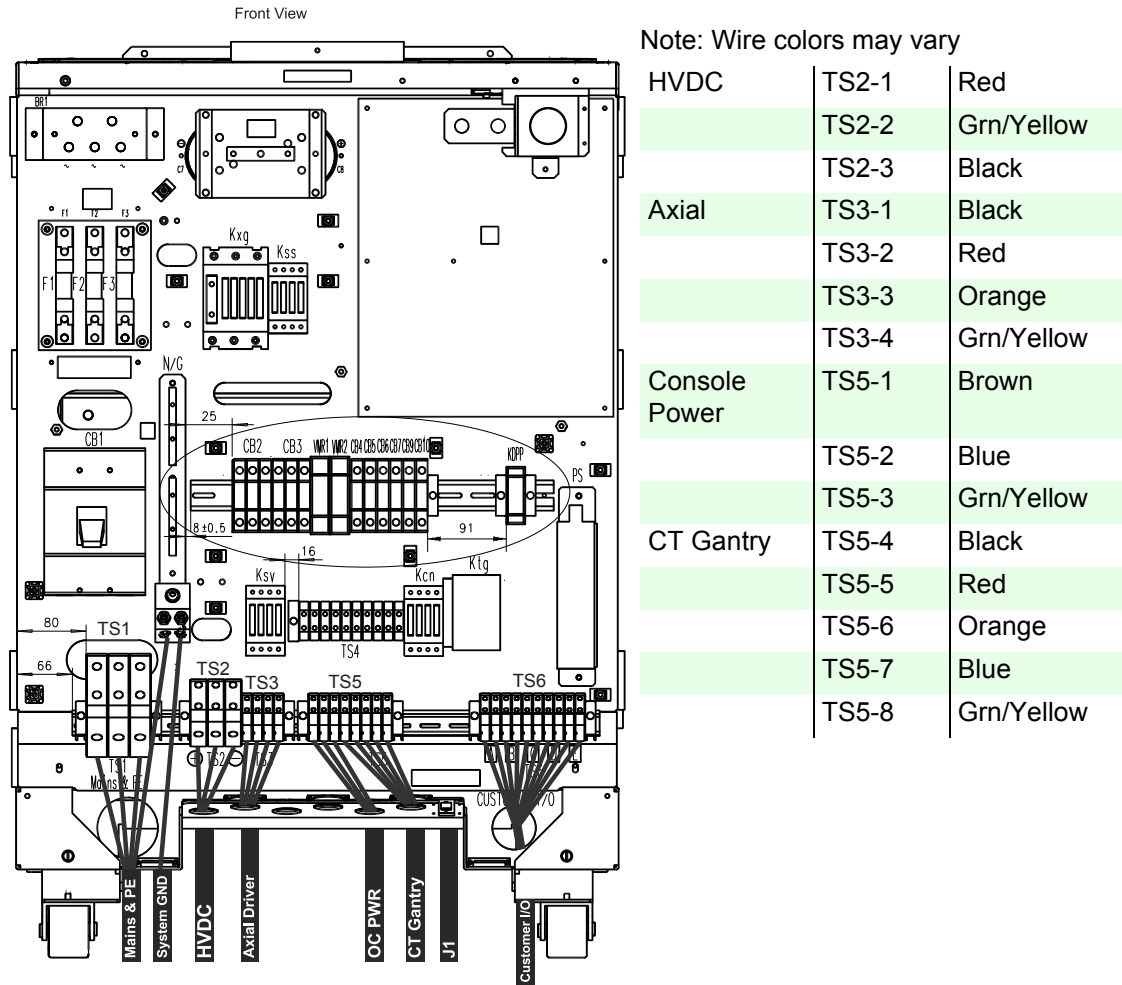


Figure 2-25 PDU Cable Connections - Front

8.1.1 Panel - 380 - 480VAC Mains “TS1” Input Power Connection

- 1.) Remove the TS3 panel front cover.
- 2.) Strip the wires to fit securely on the power block.
- 3.) Observe incoming phases (L1, L2 and L3) and insert bare leads into power block.
- 4.) Insert “vault” ground into PDU “vault” ground lug.
- 5.) Tighten all fasteners securely and replace the TS3 front panel.

| Wire Size AWG | Driver | Bolt/Hex |
|---------------|----------------------|---------------------|
| #18 - 16 | 1.67 ft-lb (2.3 N-m) | 6.25 (8.5 N-m) |
| #14 - 8 | 1.67 ft-lb (2.3 N-m) | 6.25 (8.5 N-m) |
| #6 - 4 | 3.0 ft-lb (4.1 N-m) | 12.5 (17 N-m) |
| #0 - 2/0 | | 29 ft-lb (39.3 N-m) |

Table 2-12 Power Wire Torque Values

| Wire Size AWG | Driver | Bolt/Hex |
|---------------|----------------------|---------------------|
| #14 - 8 | 1.67 ft-lb (2.3 N-m) | 6.25 (8.5 N-m) |
| #6 - 4 | 3.0 ft-lb (4.1 N-m) | 12.5 (17 N-m) |
| #3 - 1 | | 21 ft-lb (28.5 N-m) |
| #0 - 2/0 | | 29 ft-lb (39.3 N-m) |

Table 2-13 Ground Buss Bar Torque Values

8.1.2 Panel - Circuit Breakers

Place the circuit breakers in the “off/down” position during installation, even with Mains incoming power tagged and locked out. After you have completed work on the PDU, you may return the circuit breakers to the “ON” positions.

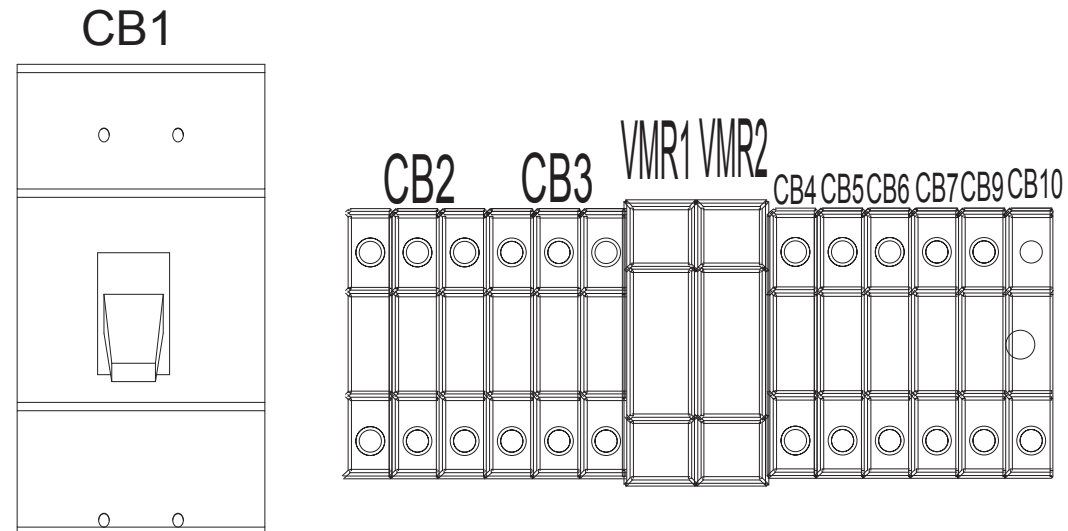


Figure 2-26 Circuit Breaker Panel

| CIRCUIT BREAKER | DESCRIPTION |
|-----------------|------------------------------------|
| CB2 | Circuit Protection (Axial Drive) |
| CB3 | Full Winding Protection |
| CB4 | CT Gantry Service Outlets |
| CB5 | CT Gantry rotating loads |
| CB6 | Table & CT Gantry Stationary Loads |
| CB7 | Operator Console Load |
| CB9 | VMR1, Control P.S Load |
| CB10 | VMR2 |

Table 2-14 Panel Circuit Breaker Descriptions

8.1.3 HVDC Connection

Note: Refer to [Table 2-3, System Interconnect Cables on page 100](#).
Connect the internally shielded HVDC cable to TS2 on the standing panel. See [Figure 2-25](#) for the location of the connector and [Figure 2-27](#) for details. Observe polarities and grounds. Do not cut or shorten cables unless you have all of the appropriate tools and crimper to re-terminate. If short cables are needed, have the PMI order the short cable set.

WARNING Excess cable length cannot be stored under or behind the PDU. If cables are to be stored in the cable tray, do not overfill. Consult the local electrician to determine the maximum fill rate for your area.

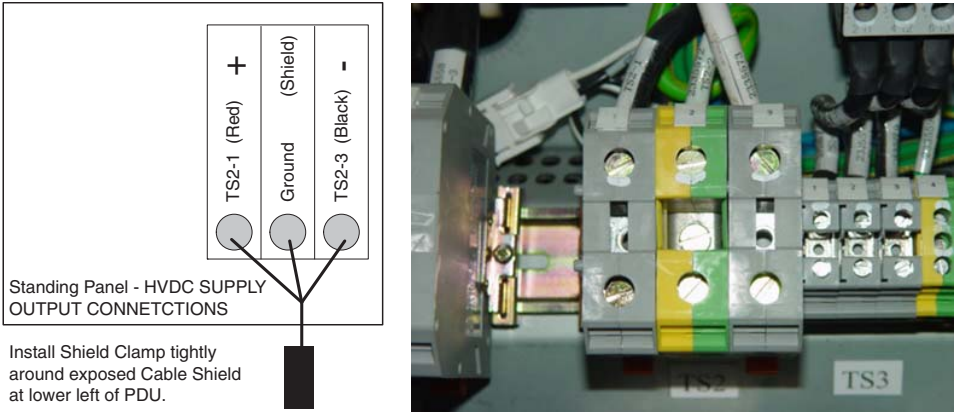


Figure 2-27 HVDC Connection

☐ Check box when complete.

8.1.4 440V Connection

Note: Refer to [Table 2-3, System Interconnect Cables on page 100](#).

Connect the internally shielded 440V cable to TS3 on the standing panel (See [Figure 2-25](#) for the location of the connector and [Figure 2-28](#) for details). Observe polarities and grounds. Do not cut or shorten cables unless you have all of the appropriate tools and crimper to re-terminate. If short cables are needed, have the PMI order the short cable set.

WARNING

Excess cable length cannot be stored under or behind the PDU. If cables are to be stored in the cable tray, do not overfill. Consult the local electrician to determine the maximum fill rate for your area.

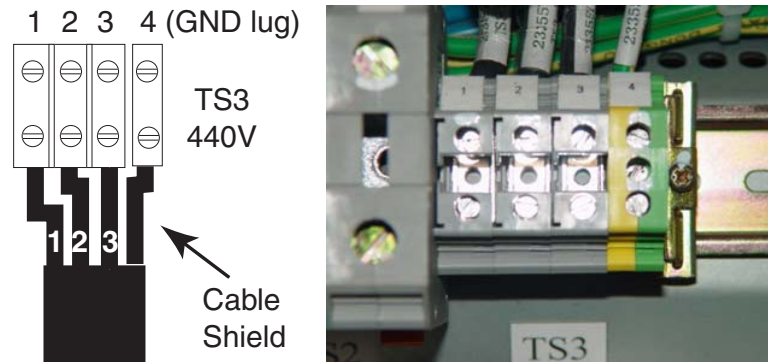


Figure 2-28 440VAC Connection

☐ Check box when complete.

8.1.5 Gantry & Console Power Connections

Note: Refer to [Table 2-3, System Interconnect Cables on page 100](#).

Do not cut or shorten cables unless you have all of the appropriate tools and crimper to re-terminate. If short cables are needed, have the PMI order the short cable set.

WARNING

Excess cable length cannot be stored under or behind the PDU. If cables are to be stored in the cable tray, do not overfill. Consult the local electrician to determine the maximum fill rate for your area.

Plug the console power cable wires to TS5, 1-3 and the gantry power cable wires TS5, 4-8 as shown in [Figure 2-29](#).

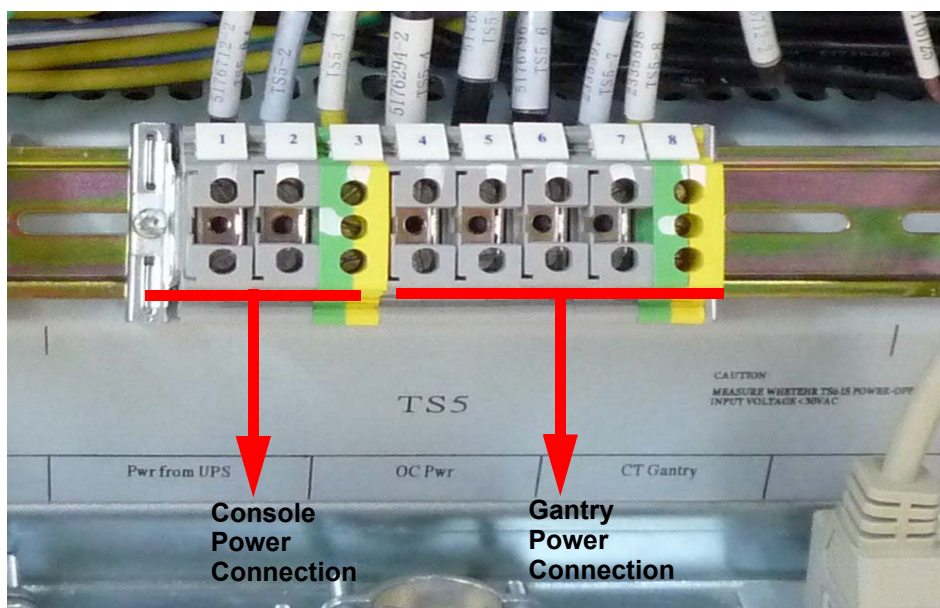


Figure 2-29 Gantry & Console Power Connections

- ☐ Check box when complete.

8.1.6 PDU Control Cable

The PDU control cable comes pre-terminated and should not be re-terminated in the field. Excess cable length must be stored. Simply plug the cable into J1 on the A panel. Secure it by using the fasteners integrated into cable's connector shell.

- ☐ Check box when complete.

8.1.7 System Ground Connection

Connect the ground wire (green with a yellow stripe) from the table/gantry raceway ground bus to the system ground lug in the PDU.



Figure 2-30 PDU System Ground Connection

8.1.8 Warning Light & Door Interlock Connections

8.1.8.1 Warning Light Configuration & Connection

- 1.) Warning Light is controlled by signals from the system.
- 2.) This step is site specific. The PDU by default is configured for “no” external warning light connection. If you have external warning lights, see [Figure 2-31](#) for proper connection.

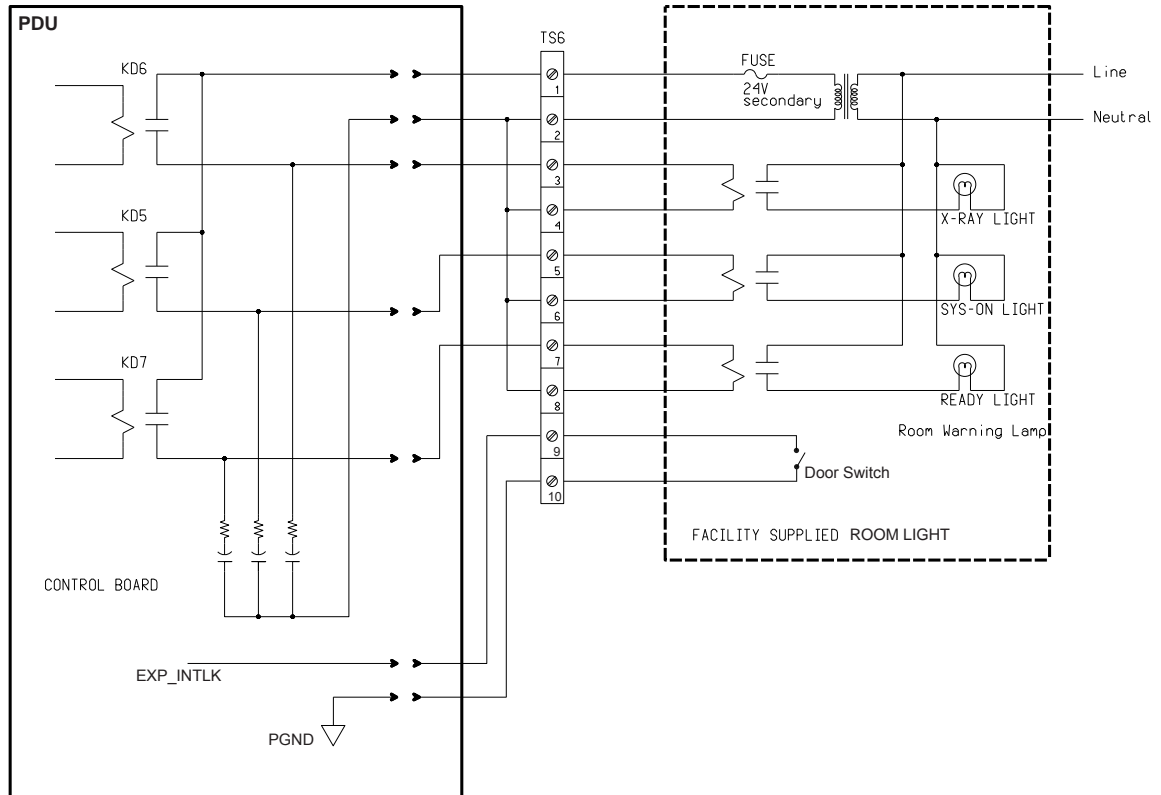


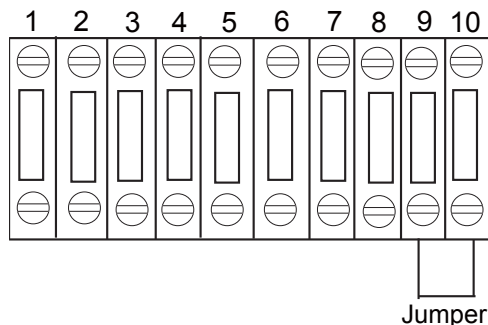
Figure 2-31 Typical TS6 Warning Light & Door Interlock Connections

It is recommended that you use the four (4) wire method of adding an X-ray warning light to a room, as shown in [Figure 2-32](#). When using this method, you:

- Minimize EMC interference.
- Increase contact life of the relay used in the PDU.

8.1.8.2 Door Interlock Connections

Door interlocks are used to prevent X-Rays from being generated when the scan room door is open. The Door Interlock circuitry in the PDU is shipped from the factory engaged. This means the system cannot generate X-ray until disengaged. A short must exist between pins 9 & 10 for X-ray to be generated. Using a small piece of wire, short pins 1 and 2 together. See [Figure 2-32](#).



If not using a door switch, add a jumper.

If jumper is not in place, exposures will not be made. Check this jumper if you get scan interlock errors.

Figure 2-32 Without a Door Interlock

To use the system with a door interlock, wire a normally open switch between pins 1 & 2 that is attached to the interlock.

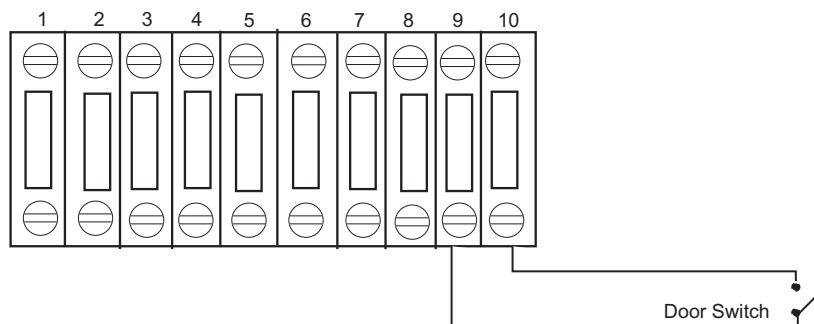


Figure 2-33 With a Door Interlock

Section 9.0 System Ground Connections

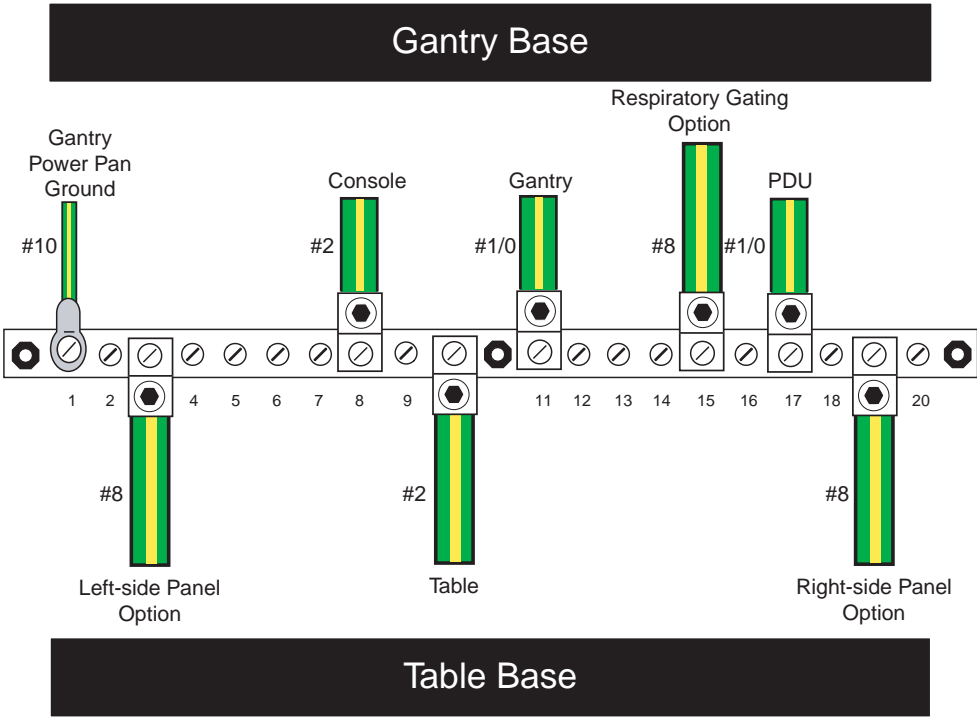


Figure 2-34 Table/Gantry Raceway Bus - Grounds

Various types and sizes of wire are used to ground the system. Please use the type and sizes specified in [Table 2-15](#).

| AWG # | Connection To | Connection To | Used on: |
|-------|---------------------------|---------------|----------|
| #10 | Gantry (Power Pan) | Raceway | All |
| #8 | Left-side Panel Option | Raceway | Option |
| #2 | Console | Raceway | All |
| #2 | Table (frame) | Raceway | All |
| #1/0 | Gantry | Raceway | All |
| #8 | Respiratory Gating Option | Raceway | Option |
| #1/0 | PDU | Power Main | All |
| #8 | Right-side Panel Option | Raceway | Option |

Table 2-15 System Ground Connections

All connections should be torqued to the values in the chart below:

| Wire Size AWG | Bolt/Hex |
|---------------|---------------------|
| #14 - 8 | 6.25 (8.5 N-m) |
| #6 - 4 | 12.5 ft-lb (17 N-m) |
| #3 - 1 | 21 ft-lb (28.5 N-m) |
| #0 - 2/0 | 29 ft-lb (39.3 N-m) |

Table 2-16 Ground Torque Values

Chapter 3

System Continuity & Ground Checks



NOTICE

Potential for Data Loss and/or Equipment Damage

To prevent potential data loss and equipment damage, please do the following:

- Record data collected from procedures in this chapter into Form F4879 when directed, located in this book.
- Only use the Installation manual that arrives with your system for installation. Any other revisions of this manual may not exactly match your system.

Section 1.0 System Continuity (Mechanical Contractor)

1.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|--------------------------|--------------|
| 1 (FE or mechanical supplier) | | 20 minutes labor on-site | |

1.2 Tools and Test Equipment

- Digital VOM with the capability to read 0.5 ohms
- 30 ft of #18 wire
- 600 VAC meter leads

1.3 Procedure

Reference : [on page 130](#) and : [on page 131](#).



WARNING



USE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES; LOCK OUT WALL POWER.

- 1.) Remove all System Power at the A1 Mains Disconnect Panel. Follow Lockout/Tagout procedures.
- 2.) Put the UPS in the Service Position.
- 3.) Remove the PDU front cover.
- 4.) Verify, with a voltmeter, that mains power is disconnected.
- 5.) Verify that less than 1 ohm of resistance exists between the following ground connections:

| FROM | TO | |
|------------------------|-------------|--|
| Wall ground connection | PDU Cabinet | <input type="checkbox"/> Check box when complete |

Table 3-1 Mains Connections to PDU

6.) Verify that less than 1 ohm of resistance exists between the following connections:

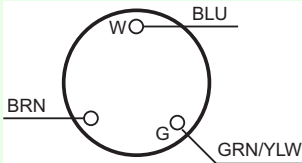
| FROM | SIGNAL NAME (COLOR) | TO | |
|----------------|-----------------------------------|---|--|
| PDU TS2-1 | +HVDC (Red) | Gantry HV Power Pan TS1-1 | <input type="checkbox"/> Check box when complete |
| PDU TS2-2 | HVDC Ground (Green/Yellow) | Gantry Power Pan Chassis | <input type="checkbox"/> Check box when complete |
| PDU TS2-3 | -HVDC (Black) | Gantry HV Power Pan TS1-2 | <input type="checkbox"/> Check box when complete |
| PDU Ground Bus | HVDC shield | Gantry HVDC cable shield | <input type="checkbox"/> Check box when complete |
| PDU TS3-1 | Axial drive 440vac (Black) | Gantry HV Power Pan TS2-1 | <input type="checkbox"/> Check box when complete |
| PDU TS3-2 | Axial drive 440vac (Red) | Gantry HV Power Pan TS2-2 | <input type="checkbox"/> Check box when complete |
| PDU TS3-3 | Axial drive 440vac (Orange) | Gantry HV Power Pan TS2-3 | <input type="checkbox"/> Check box when complete |
| PDU TS3-4 | Axial drive ground (Green/Yellow) | Gantry Power Pan Chassis | <input type="checkbox"/> Check box when complete |
| PDU Ground Bus | Axial drive shield | Gantry 440 VAC cable shield | <input type="checkbox"/> Check box when complete |
| PDU TS5-1 | 120vac Phase A (Brown) | Console Power Plug:  | <input type="checkbox"/> Check box when complete |
| PDU TS5-2 | 120vac Neutral (Light Blue) | | <input type="checkbox"/> Check box when complete |
| PDU TS5-3 | Ground (Green/Yellow) | | <input type="checkbox"/> Check box when complete |
| PDU TS5-4 | 120vac Phase A (Black) | Gantry LV Power Pan TS4-1 | <input type="checkbox"/> Check box when complete |
| PDU TS5-5 | 120vac Phase B (Red) | Gantry LV Power Pan TS4-2 | <input type="checkbox"/> Check box when complete |
| PDU TS5-6 | 120vac Phase C (Orange) | Gantry LV Power Pan TS4-3 | <input type="checkbox"/> Check box when complete |
| PDU TS5-7 | 120vac Neutral (Light Blue) | Gantry LV Power Pan TS4-4 | <input type="checkbox"/> Check box when complete |
| PDU TS5-8 | Ground (Green/Yellow) | Gantry Power Pan Chassis | <input type="checkbox"/> Check box when complete |

Table 3-2 Resistance Verification Points

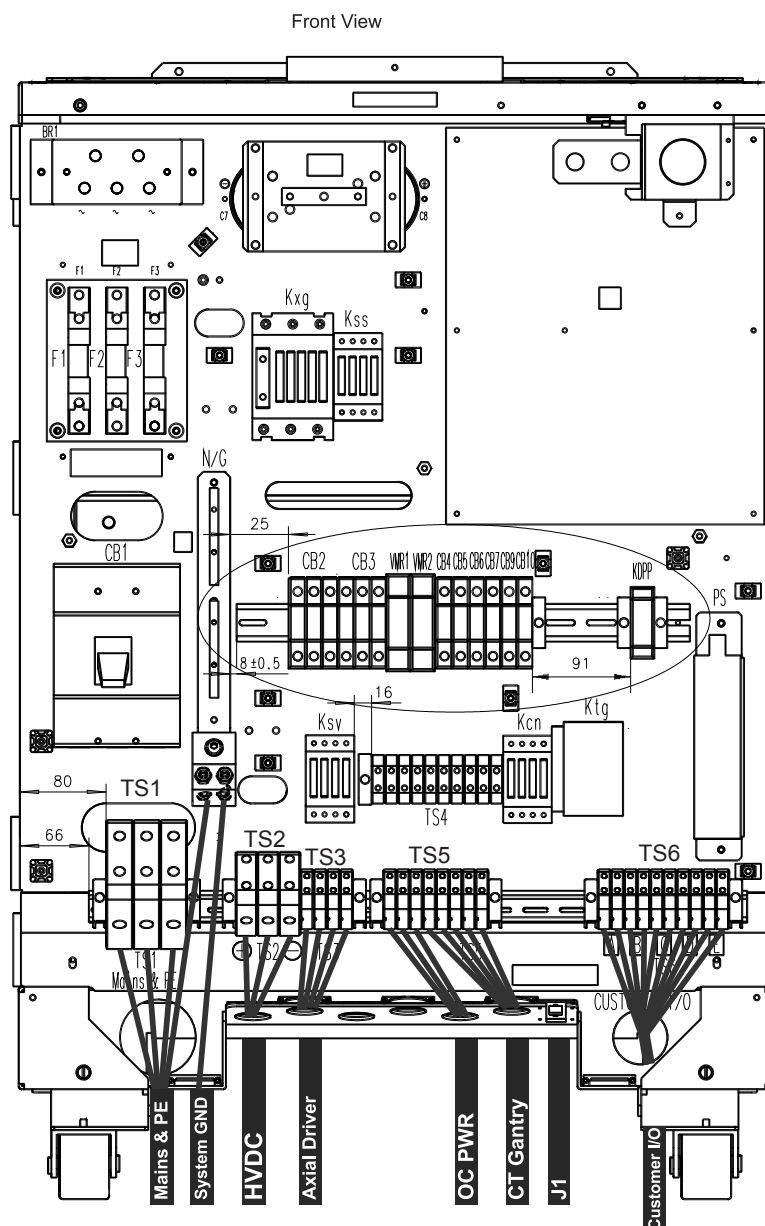


Figure 3-1 Front View of NGPDU, with Covers Removed

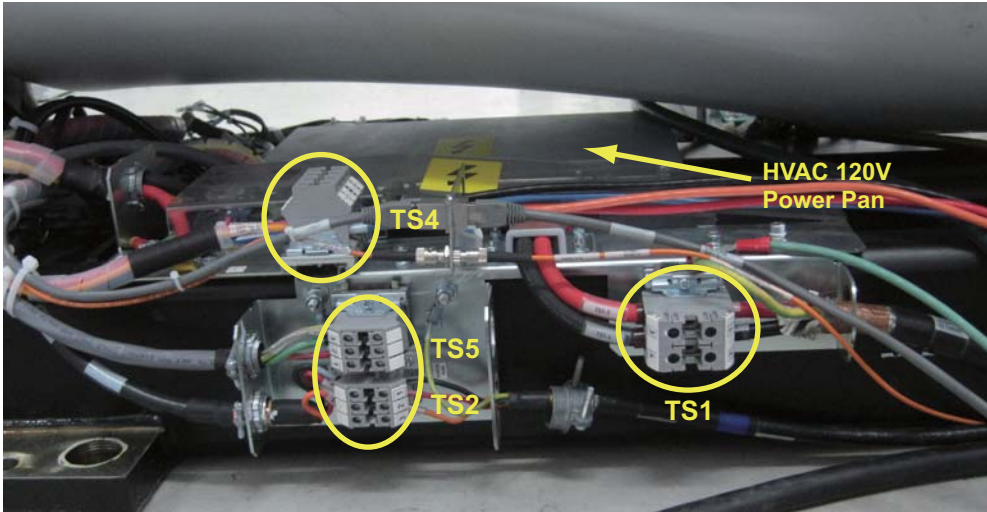


Figure 3-2 Gantry Power Pan

WARNING TURN OFF ALL PDU CIRCUIT BREAKERS.



- 7.) Set an ohmmeter to the lowest scale. Check between the following points for shorts to ground. Verify no continuity exists between the following points:

Table 3-3 No Continuity Verification Points

| FROM PDU | TO A1 BREAKER BOX | |
|--------------------------------|----------------------|--|
| TS2-1 (+HVDC) (Red) | vault ground | <input type="checkbox"/> Check box when complete |
| TS2-3 (-HVDC) (Black) | vault ground | <input type="checkbox"/> Check box when complete |
| TS3-1 (440vac output) (Black) | vault ground | <input type="checkbox"/> Check box when complete |
| TS3-2 (440vac output) (Red) | vault ground | <input type="checkbox"/> Check box when complete |
| TS3-3 (440vac output) (Orange) | vault ground | <input type="checkbox"/> Check box when complete |

- 8.) Leave the metal cover off the PDU A3 input power panel until you complete the checks in the next section.

Section 2.0 Site Ground Continuity Check

- 1.) Use an ohmmeter to verify the presence of **less than 1.0 ohm of resistance** between each of the following points:

| FROM | TO | |
|---|-----------------------------------|--|
| PDU Ground Bus | Vault Ground | <input type="checkbox"/> Check box when complete |
| PDU Ground Bus | Table/Gantry raceway ground point | <input type="checkbox"/> Check box when complete |
| Table/Gantry raceway ground point | Gantry Chassis | <input type="checkbox"/> Check box when complete |
| Table/Gantry raceway ground point | Table Chassis | <input type="checkbox"/> Check box when complete |
| Table/Gantry raceway ground point | Operator Console Chassis | <input type="checkbox"/> Check box when complete |
| All Display or Computing Options (if any) | Operator Console Chassis | <input type="checkbox"/> Check box when complete |

Table 3-4 Resistance Verification - Site Ground

- 2.) Install remaining covers on:

- Gantry
- Table
- Raceway
- Console
- PDU

Section 3.0 Shim Installation

3.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|--------------------------|--------------|
| 1 (FE or mechanical supplier) | 10 min. | 15 minutes labor on-site | 5 min. |

3.2 Tools and Test Equipment

- Standard FE Tool Kit
- Shim Kit

NOTICE Understand and Follow All General Table Safety Procedures.



3.3 Preparation

Check head holder for a tight fit. If the head holder fit is loose, follow this procedure and shim for.

- Axial head holder
- Foot extender
- Phantom holder

Introduction:

- Some Axial Head Holders have a large free-play in the horizontal direction which could potentially lead to motion and therefore image artifacts.
- Installation of the 2327335 rubber shim kit can minimize this motion.

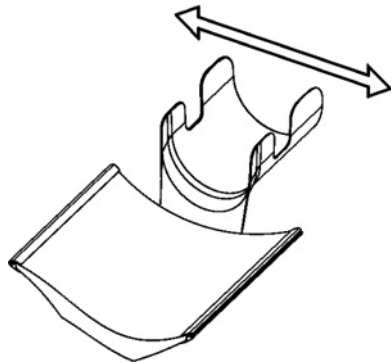


Figure 3-3 Axial Head Holder

Notes before Selecting Shim Thickness:

- While selecting the best shim size, do not attach the rubber shim yet using the adhesive on the back. It is best to use a piece of tape to hold on the shim in order to see if the size is correct.
- Selecting a shim size that is too thick may result in:
 - Difficulty latching the head holder properly. The head holder must latch so that a patient is not injured.

- Damage to the plastic latch or the plastic screws that secure it.

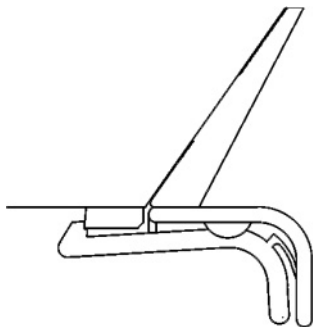


Figure 3-4 Correct - Head Holder is latched onto first step of plastic latch mechanism (The head holder does not need to be latched onto the second step)

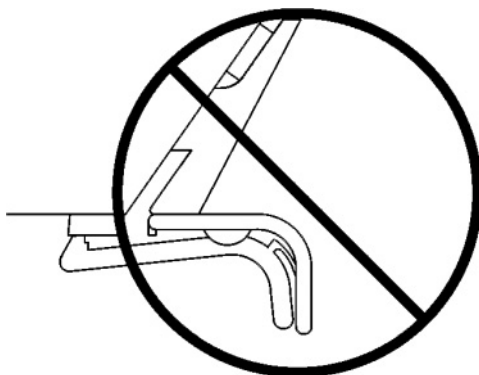


Figure 3-5 Wrong - Head Holder is NOT latched after installing shims

3.4 Procedure

- 1.) First place the two 4.0mm shims (thickest size) onto both edges of the head holder as shown (use a piece of tape to temporarily secure them)
 - The shim must be placed with the tab facing out
 - The thickness is printed on the shim

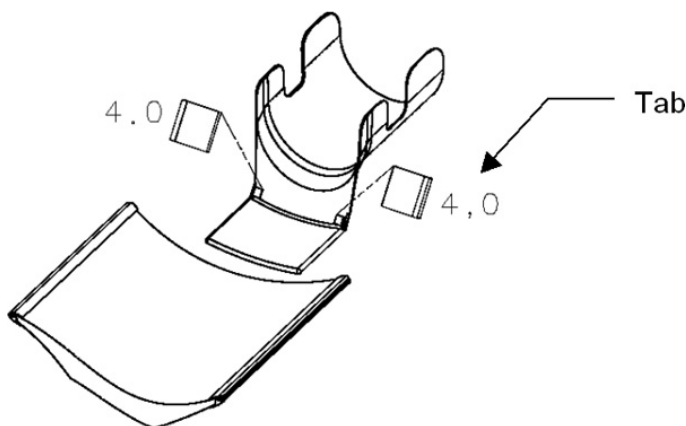


Figure 3-6 Headholder Tab

- 2.) Insert the head holder into the cradle
- 3.) Check if the head holder is latched onto the cradle at the first step of the plastic latch

mechanism. (The head holder does not need to be latched onto the second step)

- 4.) Check if the head holder has a small free-play in the horizontal direction

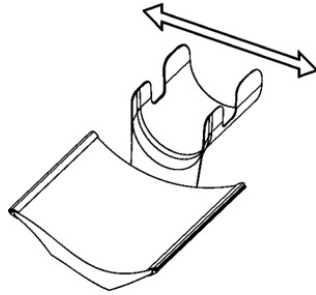


Figure 3-7 Axial Head Holder

- 5.) If the rubber is too thick, repeat steps 1-4 using a thinner shim (3.5, 3.0...0.5mm) until the head holder is latched (without excessive force) and fits securely in the cradle.
If the thinnest shim (0.5mm) is too tight, the tab can be cut off to reduce the thickness

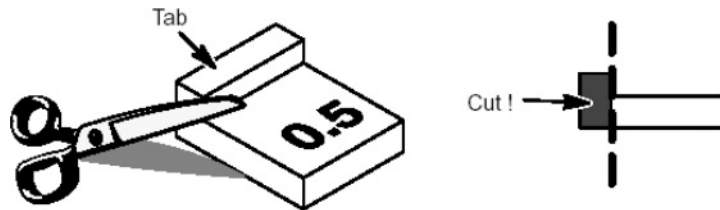


Figure 3-8 Cut the shim for Headholder

- 6.) Clean off the surfaces where the shims will mount using alcohol.
- 7.) Peel off the paper from the back of the selected shims and attach with the tabs facing out. Hold each shim with your fingers for a few seconds to attach it to the head holder.

3.5 Finalization

Review latching of head holder with customer after installation

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Chapter 4

System Covers: Installation & Alignment

Section 1.0 Process Overview

Cover install process overview:

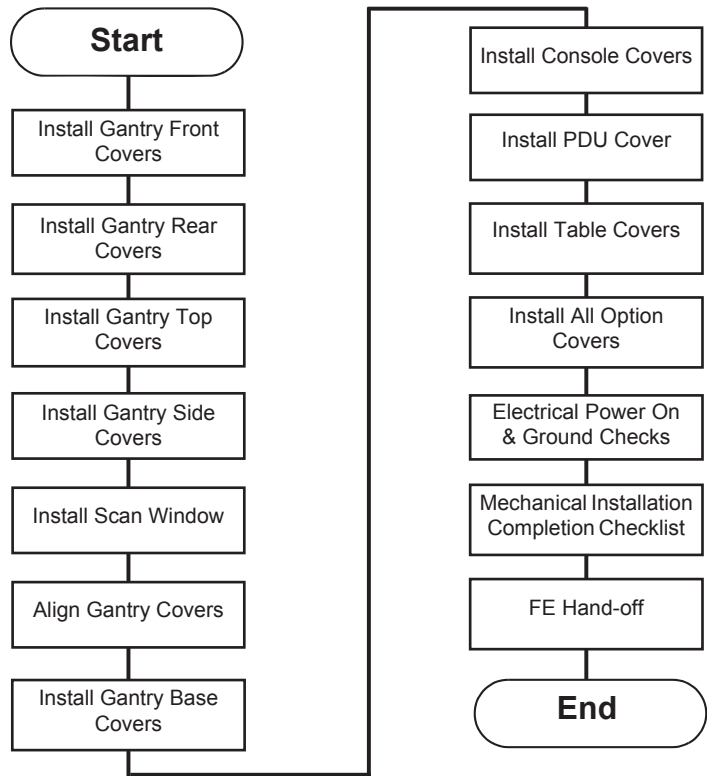


Figure 4-1 Cover Installation Flowchart

1.1 Gantry Front Cover Installation

Refer to [Appendix A](#) for the detailed procedure.

- 1.) Move the gantry to the vertical position and the front cover next to the gantry.
- 2.) Lift the cover onto the stud and attach the front cover:
- 3.) Remove the dolly; disassemble it and store it safely away for later use.
- 4.) Reattach the cables to the cover.

1.2 Gantry Rear Cover Installation

Refer to [Appendix A](#) for the detailed procedure.

- 1.) Attach the rear cover:

1.3 Gantry Bore Cover Installation

- 1.) With two persons, lift the bore cover and attach it to the gantry stationary brackets. Insert the top of the cover bracket to the gantry stationary bracket first.



Figure 4-2 Bore Cover Attachment

- 2.) Tighten 3 screws located at top and two bottom brackets of the cover.
- 3.) Connect the Breath Navigator I/F cable and MIC REAR T-SW I/F cable to the connectors.

1.4 Gantry Top Covers

1.4.1 Installation

- 1.) Take one of the top covers and align the tabs on the cover with its associated bracket. Lift and slide the cover into place. Secure the cover using 2 Phillips screws.
- 2.) Repeat the same step for the other side.

1.5 Gantry Side Covers

1.5.1 Installation

- 1.) To install a side cover, place it over the top cover and let the two (2) side cover latches slide behind the metal tabs, located on the top cover.
- 2.) Use hex wrench to secure the side cover to front cover by turning the bolts a quarter turn..

1.6 Scan Windows

1.6.1 Installation

Note: The front and rear covers must be installed before installing the scan window.

- 1.) Shape the scan window as shown in [Figure 4-3](#), and nest the scan window at the bottom of the opening between the front and rear covers, ([Figure 4-4](#)) with the rivets in the 6 o'clock position. Remember the rivets must be in the 12 o'clock position when the mylar window is fully installed.
- 2.) After you complete the initial seating of scan window, let the window slowly unfold, and work both sides of the window into position, starting at the bottom and finishing at the top.
- 3.) Make sure you position the window with the rivets at the 12 o'clock position, and the mylar window slit at either the 3 or 9 o'clock position.

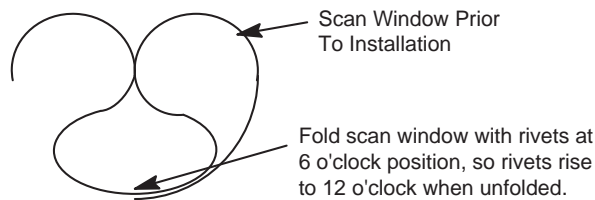


Figure 4-3 Install Scan Window

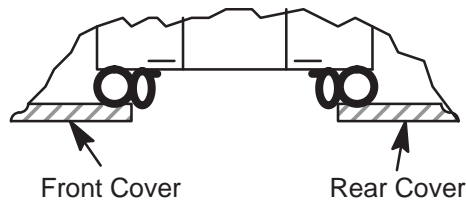


Figure 4-4 Scan Window Nested Between Front and Rear Cover

1.7 Install Gantry Base Covers

1.7.1 Tools Required

3mm and 8mm hex wrenches

1.7.2 Procedure

Assembly Sequence

- 1.) Position cover item 5 on gantry base with bracket slots aligned to gantry holes. Center Cover left to right and attach with (4) hardware Items 16, 2, 3 as shown and tighten.
- 2.) Assemble (2) Bulkheads (Item14) to (2) Brackets (Item 13) using (4) Hardware Items 3 & 4. Assemble (2) Brackets (Item 10) and (2) Brackets (Item 13) to Gantry Base using (8) Hardware Items 1, 2 & 3. Finger tighten hardware with bracket moved outward to end slots (Item 10). Install side covers (Item 6 & 7) on properly aligned with front cover. Remove side covers, tighten fasteners and replace side covers using hardware (1) Item 16, & 2, & 3, and (2) Item 15 on each cover and tighten.
- 3.) Assemble last Bracket (Item 11) loosely to gantry base with (2) hardware Items 1, 2 & 3. Install rear cover (Item 8) to base properly aligned to side cover (Item 6).
Attach rear cover to bracket with hardware Items 1, 2 & 3 tightening all fasteners. Lock latch.
- 4.) Place cover Item 9 on gantry base aligned to covers 8 & 9. Lock both latches.

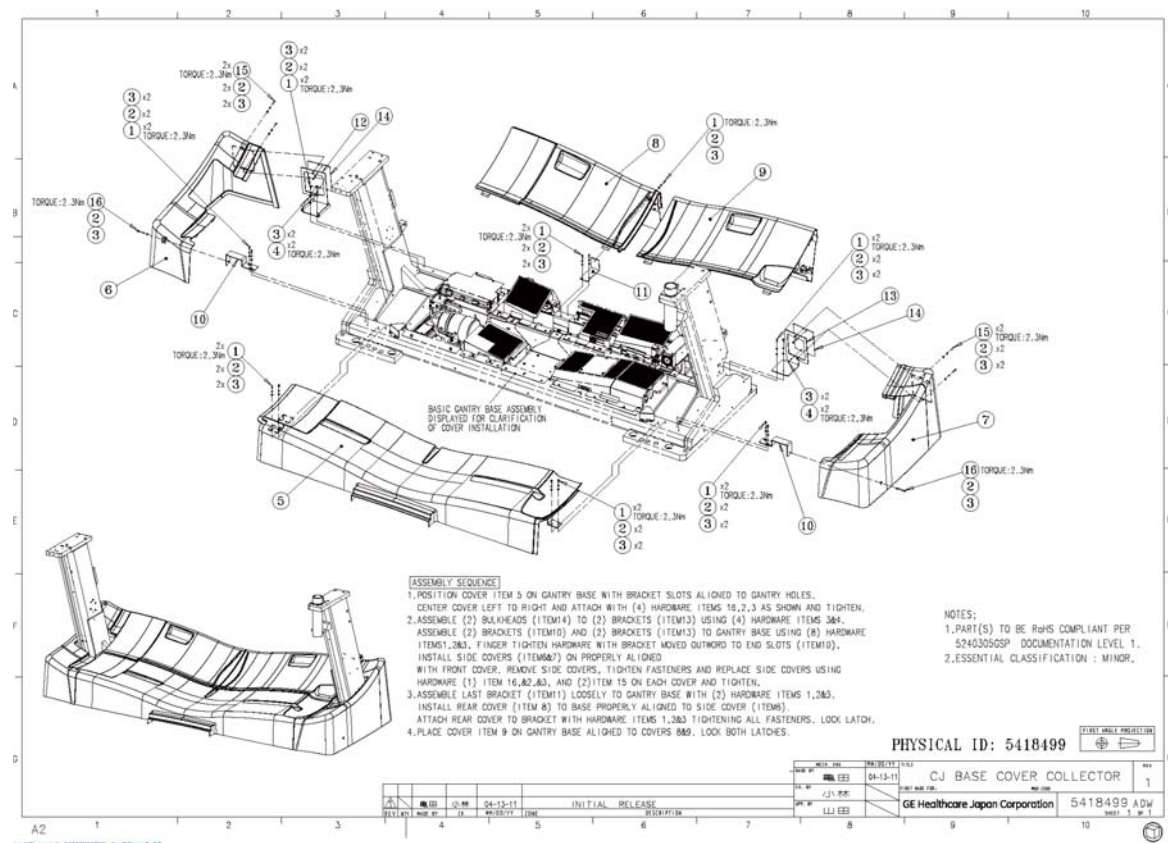


Figure 4-5 Gantry Base Covers Installed

1.7.3 Footswitch Covers Installation (GT1700V)

- 1.) Install the footswitch cover using three (3) screws (see [Figure 4-6](#)).

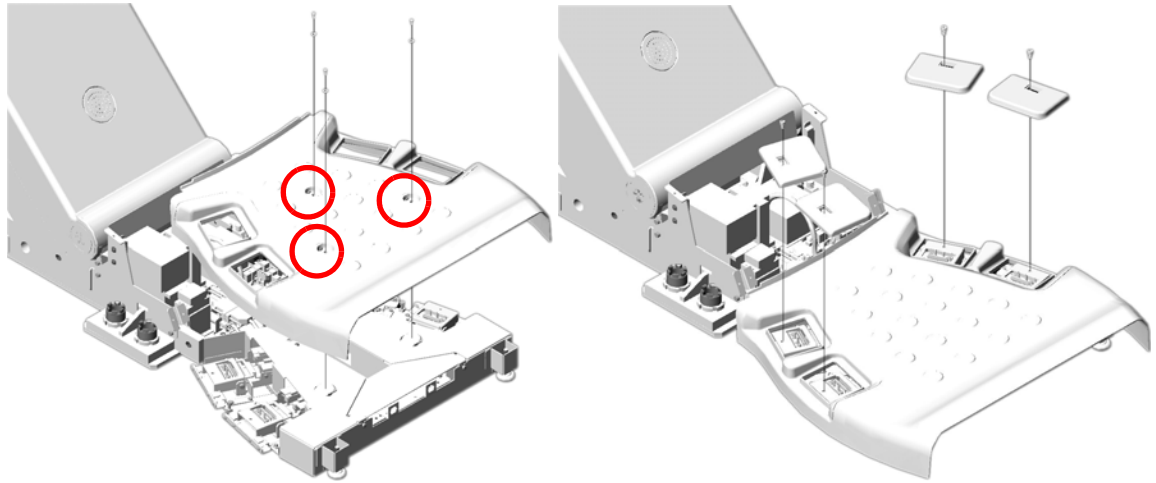


Figure 4-6 Footswitch Cove Installation

- 2.) Install cover caps on each pad.



Figure 4-7 Footswitch Pad Caps

- 3.) Install the four (4) pads onto the footswitch assembly.

Section 2.0 Install NIO Console Covers

2.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|--------------------------|--------------|
| 1 (FE or mechanical supplier) | | 15 minutes labor on-site | |

2.2 Tools and Test Equipment

- 4mm Hex driver

2.3 Procedures

2.3.1 Console Side Covers

- 1.) Swing the side cover into position.
- 2.) Insert top edge of side cover into inside of top cover. The distance between side cover rear edge and chassis should be about 20mm.
- 3.) Move side cover forward and fix it on chassis.

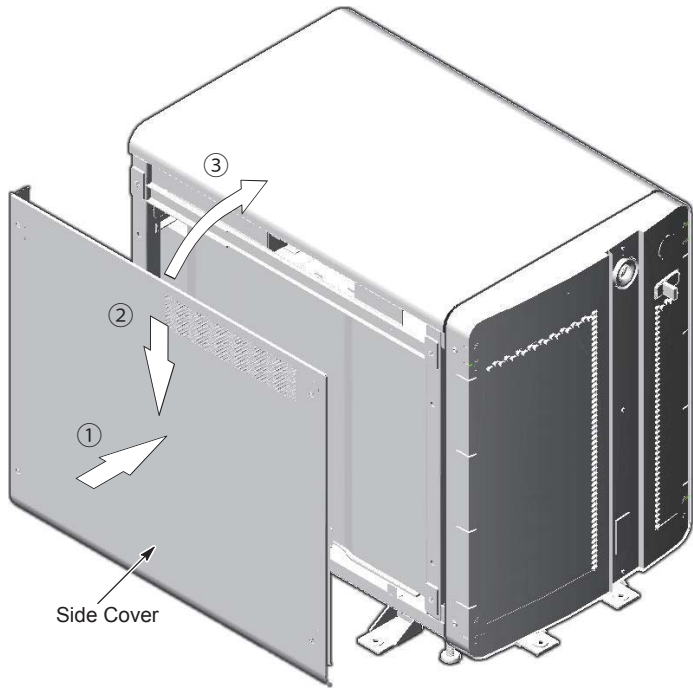


Figure 4-8 Place Side Cover

- 4.) Tighten the four screws at the side cover.

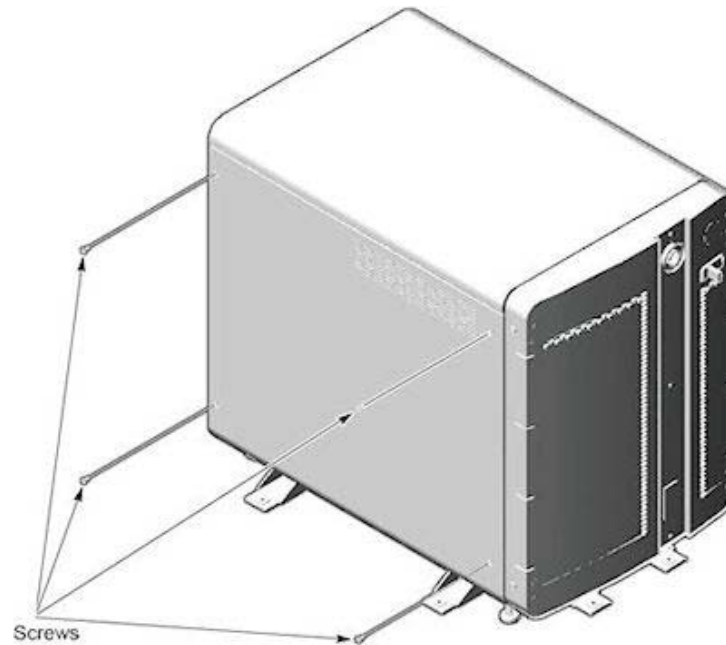


Figure 4-9 Install Side Cover Screws

2.3.2 Console Top Cover

- 1.) Insert two pins of top cover into the hole in the chassis.
- 2.) Slide cover backward and fix cover on chassis.

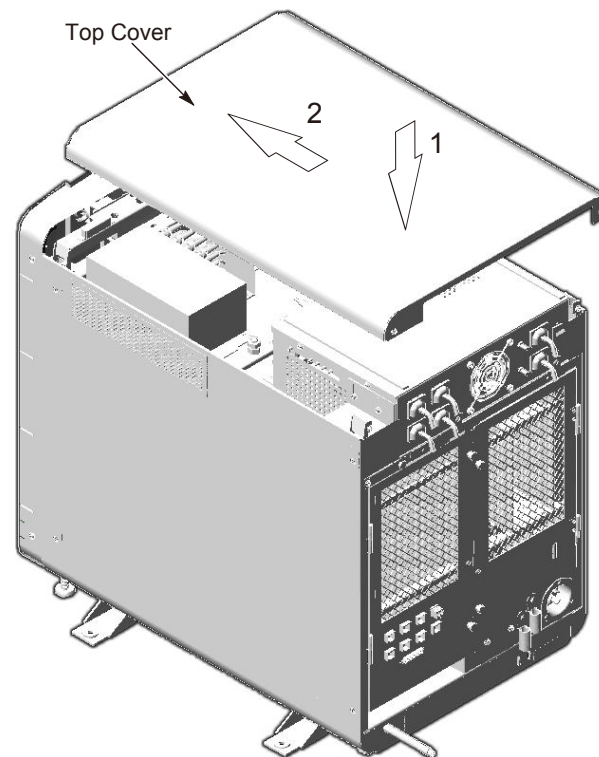


Figure 4-10 Place Top Cover

- 3.) Tighten two screws at behind of top cover.

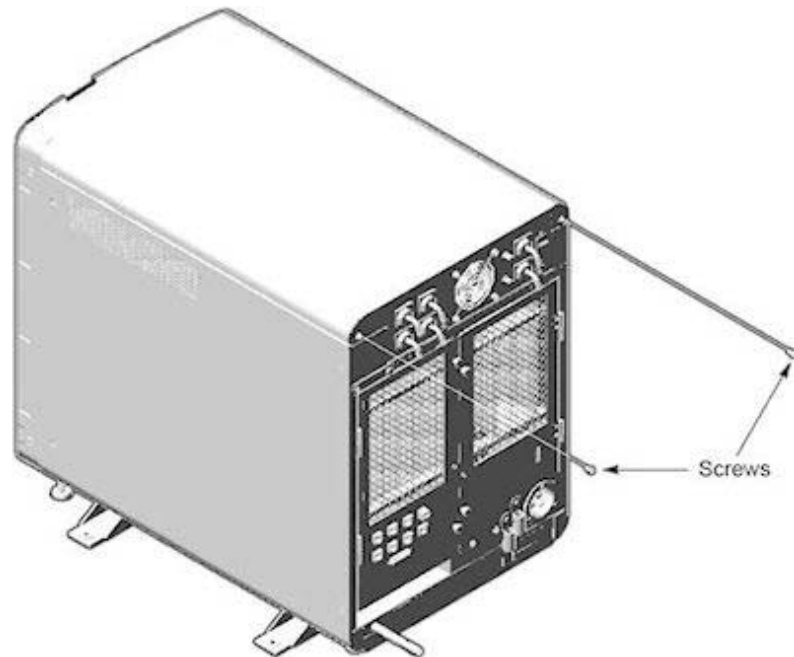


Figure 4-11 Install Top Cover Screws

2.3.3 Console Front Cover

- 1.) Place the front cover onto console.
- 2.) Rotate bottom of cover outward and upward until the cover is placed on the console.

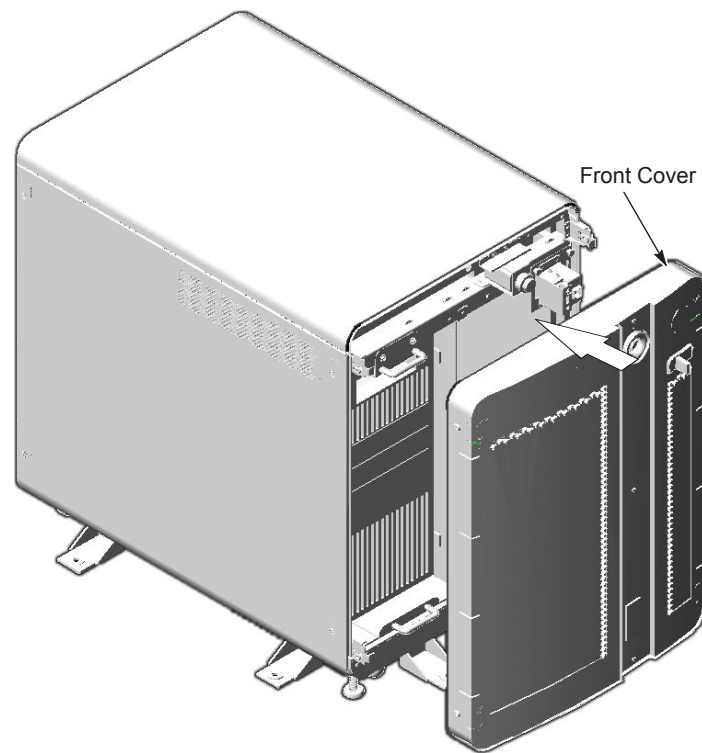


Figure 4-12 Place Front Cover

- 3.) Install four screws (two screws on each side).

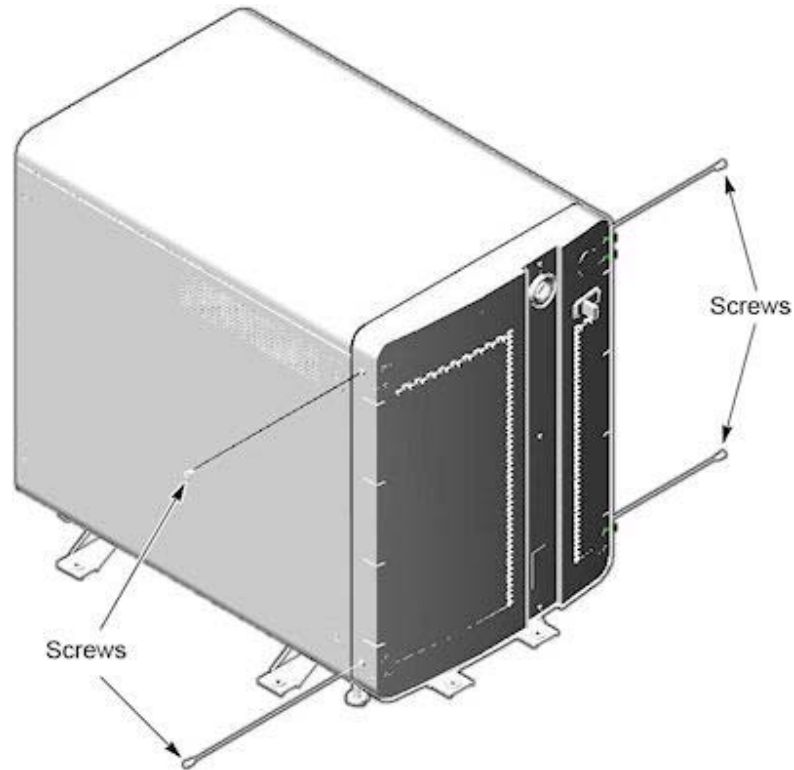


Figure 4-13 Install Front Cover Screws

Section 3.0 Table Cover Installation (GT1700V)

3.1 Side Covers

- 1.) Remove screws (2) on tape switch.
- 2.) Remove back under-side covers (2) plus black screws.
- 3.) Undo the 2 red/black connectors.
- 4.) Remove all six (6) 4mm hex-head screws.

3.2 Install Panels

3.2.1 Top Panel #1

- 1.) Install two (2) 4mm hex-head screws. Leave them loose until the bottom screws are installed.
- 2.) Install 6nd wire using one (1) 4mm hex-head screw.

3.2.2 Bottom Panel #1

- 1.) Install white washer between grey base and panel. Insert Phillips screw into the bushing.
- 2.) Tighten top screws. (Torque 8 lb-in)

Note: Second panel over laps the first panel

3.2.3 Top Panel #2

- 1.) Install two (2) 4mm hex-head screws. Leave them loose until the bottom screws are installed.
- 2.) Install 6nd wire using one (1) 4mm hex-head screw.

3.2.4 Bottom Panel #2

- 1.) Insert white washer between grey base and panel. Insert Phillips screw into the bushing.
- 2.) Tighten Phillips screws. Tighten top screws.

3.3 Re-install Side Panel

- 1.) Install with two (2) Phillips screws. Reconnect cable.

3.4 Table Side Covers Install

- 1.) With the side covers toward table front, align the tabs on the cover with the slots on the table.
- 2.) Slide the cover toward the table until it stops.
- 3.) Slide the cover toward the back of the table to lock the cover in place.
- 4.) Install the two (2) 4mm hex-head screws on each end to secure cover. (1700 Table: Install one (1) screw.)

3.5 Table Side Covers Removal

- 1.) Remove the two (2) 4mm hex-head screws that secure the side cover. (1700 Table: Remove one (1) screw)
- 2.) Slide the cover toward the gantry until the locking tabs disengage and the cover is free.
- 3.) Pull the cover away from the table to remove.
- 4.) Store in a safe place.

Section 4.0 Table Covers Installation (Lite Table)

4.1 Table Base Cover

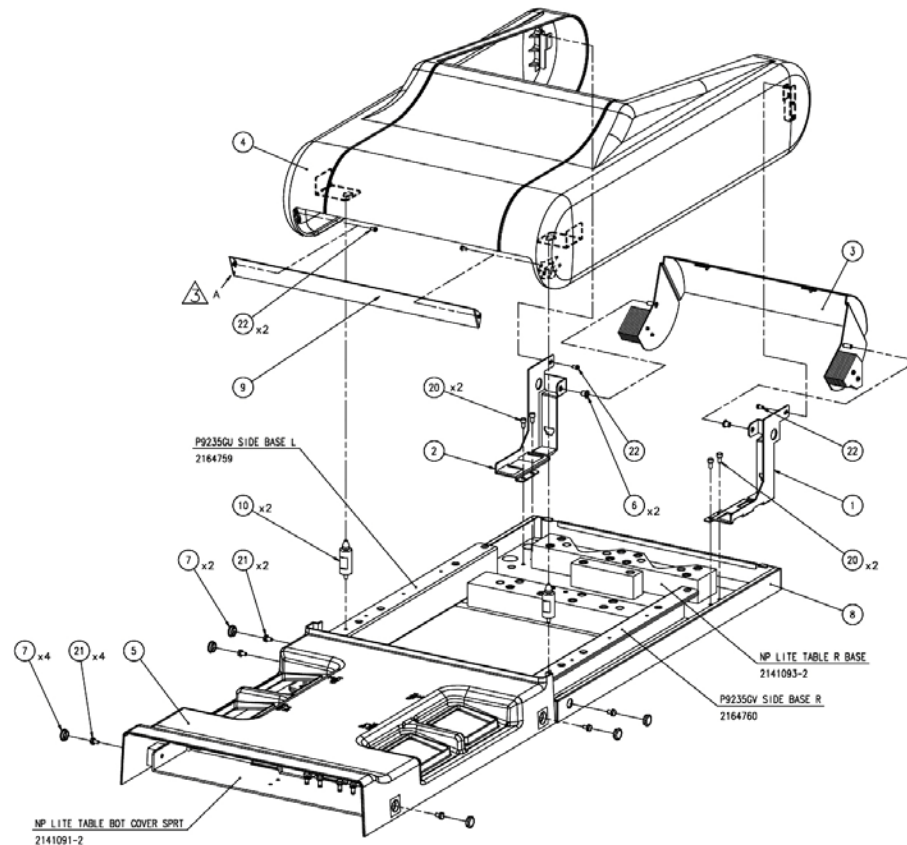
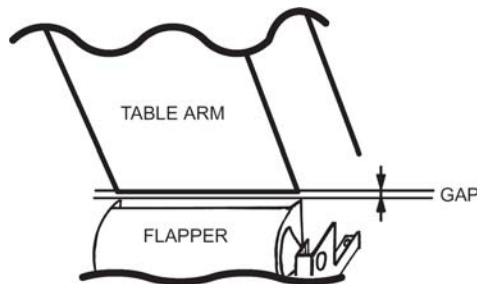


Figure 4-14 Table Base Cover

4.2 Flapper Installation

- 1.) Insert two (2) plastic rings into the left side of flapper and the right side of flapper.
- 2.) Attach two flapper brackets to the flapper.
- 3.) Tighten it to the Table rear bottom by four (4) support bracket screws. There is a gap between the flapper and the table arm as shown in the Illustration below. When the flapper is installed on the table base, the left gap and the right gap must be equal using four (4) support bracket screws.



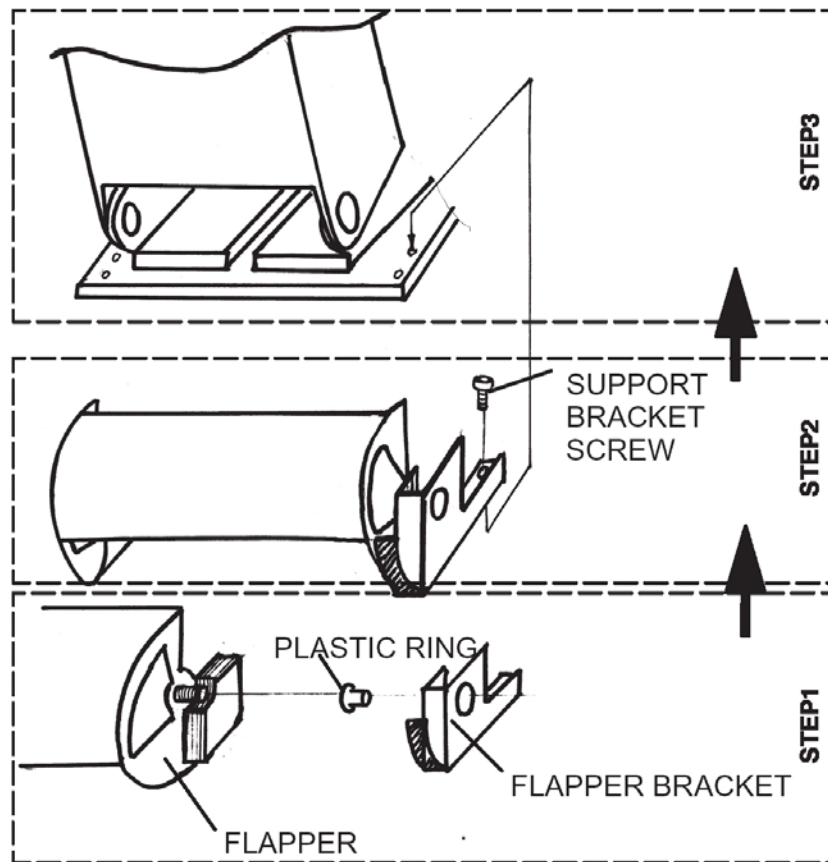


Figure 4-15 Installing the Table Flapper

4.3 Skirt Cover installation

- 1.) Attach Skirt Cover to flapper brackets.
- 2.) Mount Skirt Cover to table bracket with two screws.



Figure 4-16 Installing Skirt Cover

4.4 Bottom cover installation

- 1.) Install the front bottom cover using four screws. After installation, install the screw caps onto the screws.
- 2.) Install the foot switch pedals using four socket screws. After installation, install the screw caps onto the screws.
- 3.) Install the rear bottom cover so that its tabs are aligned with the frame pins.
- 4.) Pull the cover rearwards, then mount it using two screws.
- 5.) After installation, install the screw caps onto the screws.

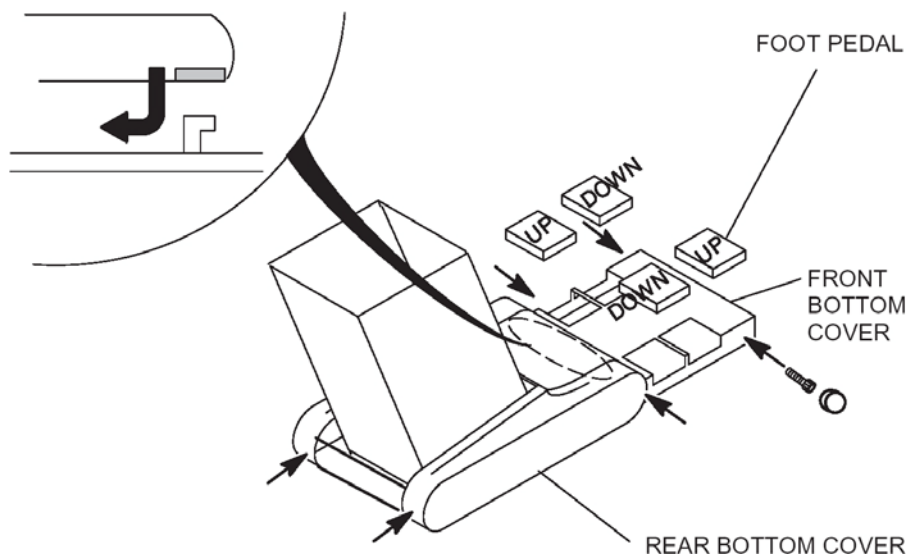


Figure 4-17 Installing the Bottom Covers

Section 5.0 Install All Option Covers

Follow the instructions that came with each of your optional components.

Section 6.0 Electrical Power On & Ground Checks

WARNING



THIS PROCEDURE MEASURES POTENTIALLY HAZARDOUS VOLTAGES. USE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.

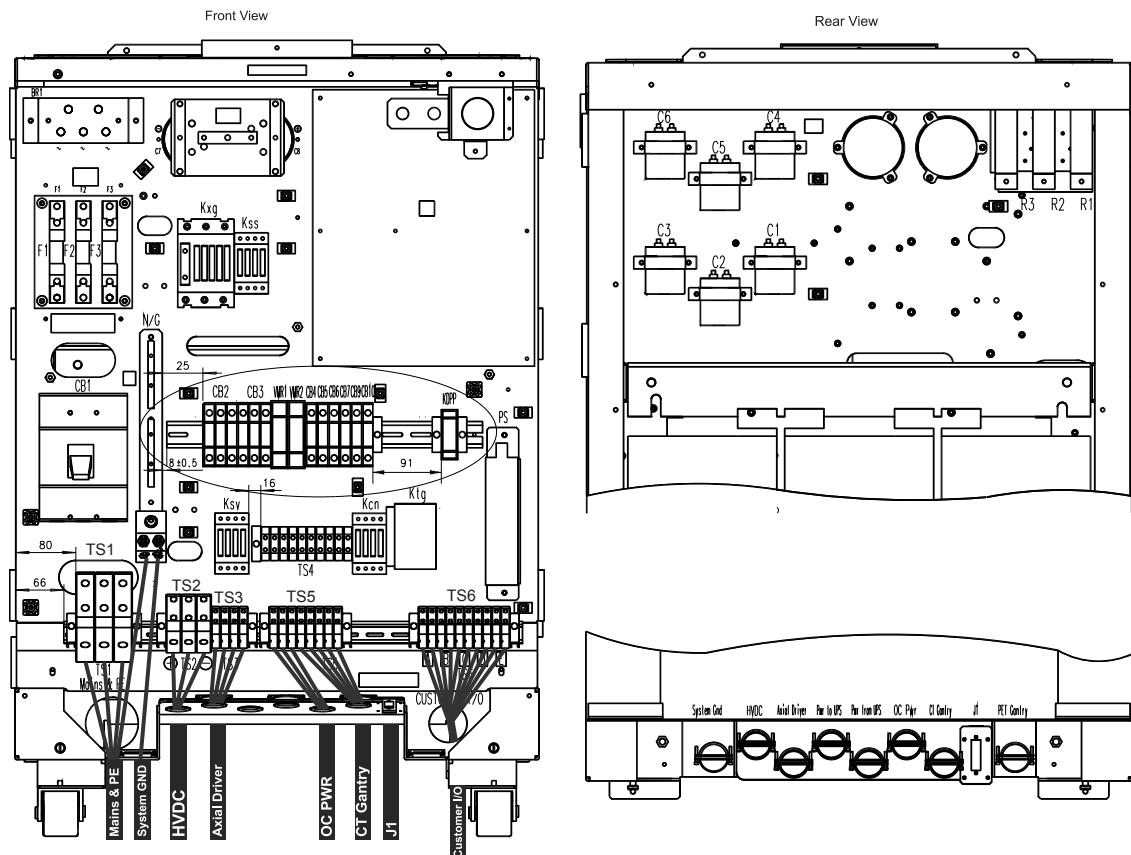
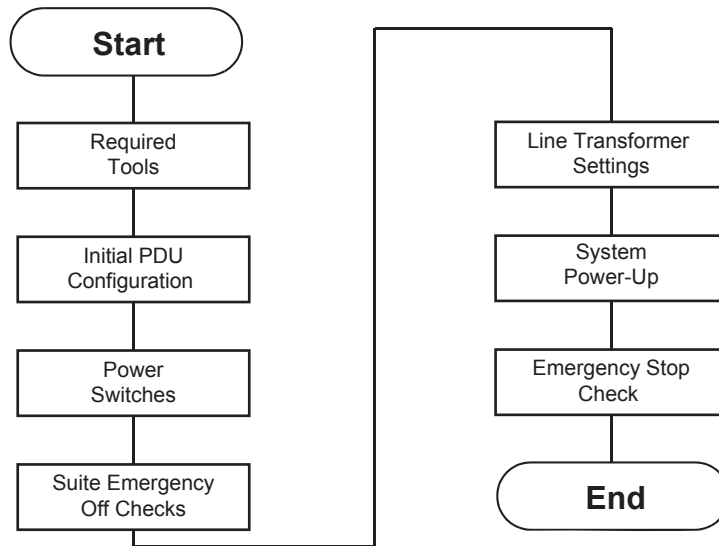


Figure 4-18 NGPDU

6.1 Introduction and Flowchart



6.2 Electrical Power On & Ground Checks Process Overview

6.3 Required Tools

- Multimeter with a rating of at least 1000 volts
- Multimeter leads with a rating of at least 1000 volts

6.4 Initial PDU Configuration



WARNING THIS PROCEDURE MEASURES POTENTIALLY HAZARDOUS VOLTAGES. USE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.

6.4.1 Circuit Breakers

Set all PDU, gantry, console, and table circuit breakers to OFF.

6.4.2 Relay Board

- 1.) Set SW 2 to the Auto-Off position.
- 2.) When the system is powered, three lamps should be "ON". (Refer to [Figure 4-19](#).)

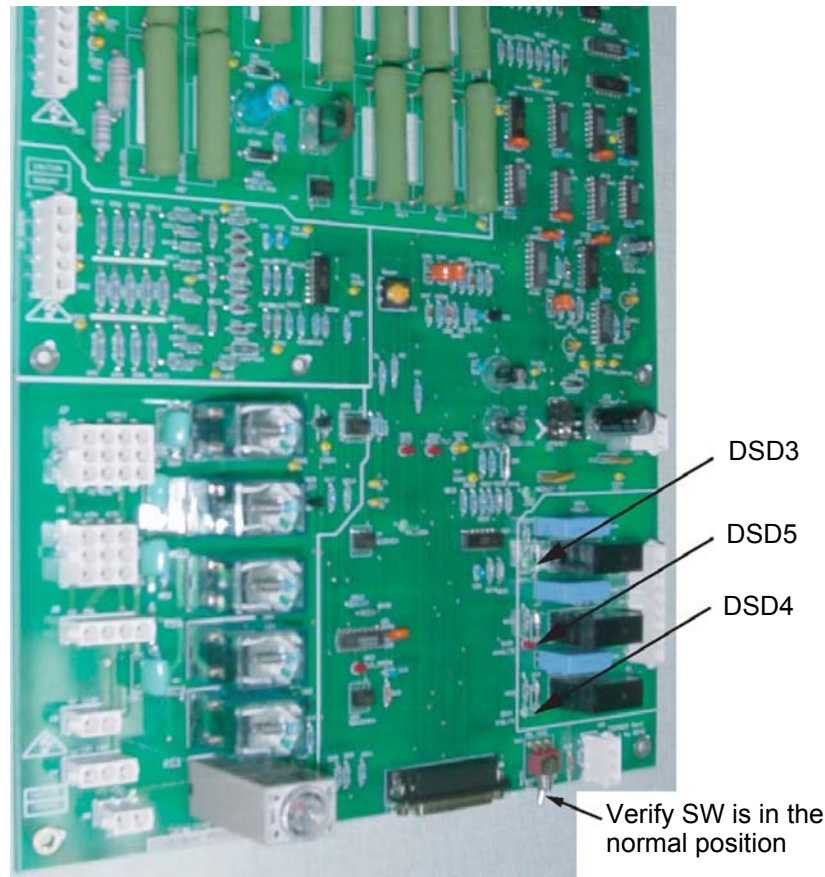


Figure 4-19 NGPDU Control Board

6.4.3 Power Switches

Turn OFF all system power switches at their subsystems.

- Gantry power pan breaker
- All gantry service switches
- Table base power
- Console power



6.4.4 Hardware and Connection Check

Use this step to check mechanical connections and tighten anything that may have shaken loose during shipment. Verify all hardware and connections in the PDU are securely fastened.

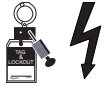
- PDU
- Gantry
- Table
- Console

6.4.5 Covers

Install, or verify the presence of, all the lexan safety covers for the PDU.

6.5 Suite Emergency Off Checks

WARNING



ONLY PERFORM THIS PROCEDURE IF YOU ARE USING PROPER PPE. 480 VOLTS MAYBE PRESENT. VERIFY ALL PERSONNEL HAVE CLEARED THE SYSTEM BEFORE YOU TURN ON WALL POWER.

Note:

- 1.) Turn wall power ON to the PDU.
- 2.) **Press the suite emergency off button and verify it turns off wall power to the PDU.**
(Typically, this red palm button is located on the wall close to the console, within the scan suite.)
- 3.) Verify that all "Emergency Off" buttons are working properly.
- 4.) Leave power "OFF".

6.6 Line Transformer Settings

6.6.1 Requirements

- 1.) The PDU is shipped configured for 480VAC.
- 2.) Complete only if your site uses a voltage other than 480VAC.
- 3.) If PDU is configured for 480VAC, go to [6.7](#). Otherwise, proceed to [Section 6.6.2](#).

WARNING



MAKE SURE YOU TURNED OFF, TAGGED AND LOCKED THE MAIN WALL POWER BEFORE YOU CHANGE TAPS. FAILURE TO DISCONNECT POWER AT MAIN INPUT MAY RESULT IN ELECTROCUTION. TURN OFF WALL POWER TO CONNECT OR MOVE METER LEADS, OR TO REMOVE OR INSTALL COVERS. WEAR APPROPRIATE ELECTRICAL PPE.

6.6.2 Line Input Conditions

- 1.) Monitor the No Load Line to Line Voltage at L1, L2, L3, during the workday. Do not record this data during "brown out" conditions.
- 2.) After you determine the nearest nominal line, verify the tap connections match (refer to [Table 4-1](#) and [Figure 4-20](#) for tap locations).

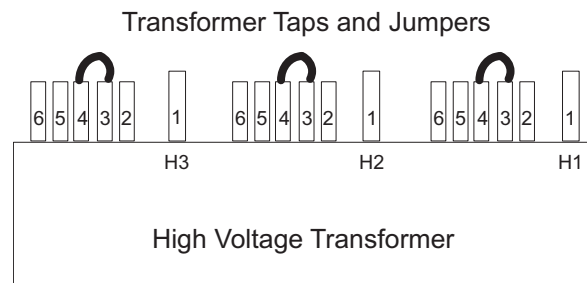


Figure 4-20 PDU Tap Positions (Rear)

Note:

Taps should be shipped as shown for 480 VAC only. For all others, you must move the taps. The tap check should be completed by the mechanical installer.

- 3.) Verify that the No Load Line to Line Voltage never falls outside the corresponding minimum and maximum values listed in [Table 4-1](#).

- 4.) Use a 0-750 AC voltmeter of 3/4% accuracy to measure the line-to-line voltages at L1, L2, & L3.
 - Verify the highest line-to-line voltage does not exceed 1.02 times the lowest voltage.
 - **Example:** If the lowest voltage equals 474, the highest voltage should not exceed $474 \times 1.02 = 483.5$ volts.

WARNING



THIS PROCEDURE MEASURES POTENTIALLY HAZARDOUS VOLTAGES. USE AND FOLLOW LOCKOUT/TAGOUT PROCEDURES.

| No Load Line to Line Voltages | | Tap Connections (All 3 phases must have same the configuration) | | |
|----------------------------------|---------------------|--|--------------------|--------------------|
| Nominal | Maximum Range (10%) | Phase A Connection | Phase B Connection | Phase C Connection |
| 480V* | 432 to 528* | 3-4* | 3-4* | 3-4* |
| 460V | 414 to 506 | 3-5 | 3-5 | 3-5 |
| 440V | 396 to 484 | 3-6 | 3-6 | 3-6 |
| 420V | 378 to 462 | 2-4 | 2-4 | 2-4 |
| 400V | 360 to 440 | 2-5 | 2-5 | 2-5 |
| 380V | 342 to 418 | 2-6 | 2-6 | 2-6 |
| 240V** | 216 to 264** | 1-4** | 1-4** | 1-4** |
| 220V** | 198 to 242** | 1-5** | 1-5** | 1-5** |
| 200V** | 180 to 220** | 1-6** | 1-6** | 1-6** |
| * Factory Default | | | | |
| ** 2326492-3 PDU only | | | | |

Table 4-1 PDU Line Tap Connections

Record system voltages here:

Phase A: _____ Phase B: _____ Phase C: _____

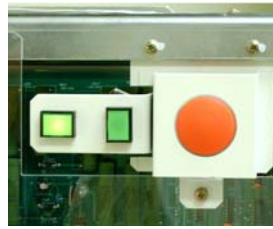
6.7 System Power-Up

CAUTION Verify all personnel have cleared the system before you turn on wall power.

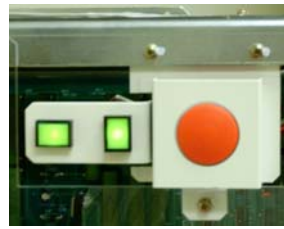
- 1.) Turn ON the A1 breaker panel.

Note: Do not stand in front of the main disconnect to turn on power.

- 2.) Turn ON all system power switches and breakers (PDU, gantry, table, console).
 - All PDU breakers
 - Make sure that the on/off button (on the front PDU panel) is ON for console power.



PDU Power Switch Off



PDU Power Switch On

- Gantry power pan breaker
- All gantry service switches
- Table base power
- Console power (Check internal breaker.)

SUB-SYSTEM POWER-UP

- 1.) Turn ON switch S3 in the table (120VAC 24-hour power).
- 2.) Turn the gantry **120 - 208VAC** to ON. (Light should turn on.)
- 3.) Turn **AXIAL DRIVE ENABLE** ON. (Light should turn on.)
- 4.) Turn **HV DC ENABLE** ON. (Light should turn on.)
- 5.) Push the Service Switch Panel reset button. (See [Figure 4-21](#))

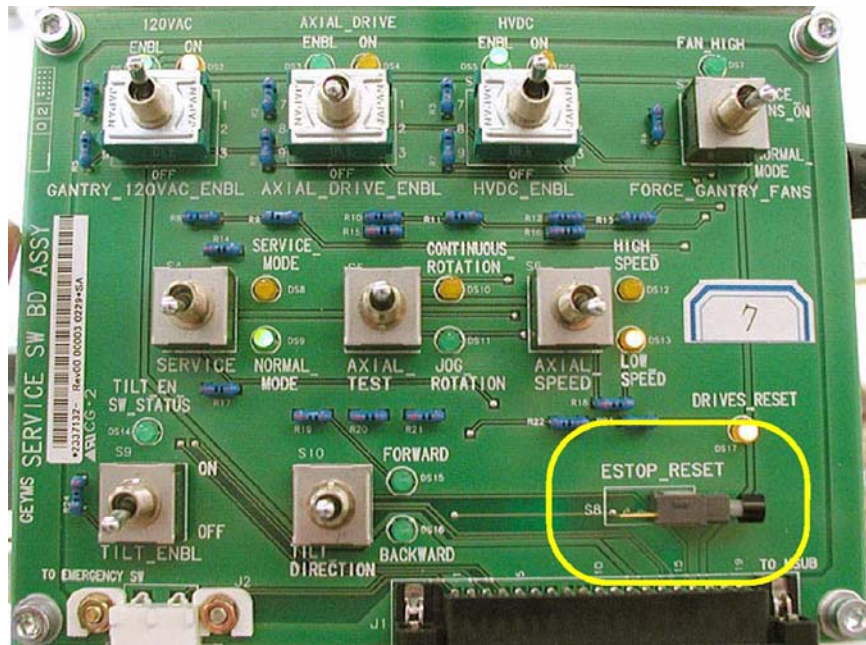


Figure 4-21 Service Switch Panel

AXIAL ENABLE SWITCH TEST

- 1.) Unplug all top cover fan plugs.
- 2.) Turn OFF axial drive enable switch **AXIAL_DRIVE** on the Service Switch Panel.

Note: For the initial condition, do NOT leave the tube at the 2:30 position.

- 3.) Clear the gantry area for rotation.
- 4.) Press the alignment light push button.
- 5.) Verify that the gantry did not rotate.

ROTATION SAFETY CHECKLIST

- 1.) Manually rotate the gantry 360 degrees.
 - Listen for any interference between the rotating and stationary parts.
(Correct any interference problems.)
 - Listen for any loose parts.
(Tighten parts as needed.)
- 2.) Turn ON all enable switches.

WARNING

MAKE SURE THERE ARE NO OBSTRUCTIONS AROUND THE GANTRY. PRESSING THE ALIGNMENT LIGHT PUSHBUTTON WILL CAUSE THE GANTRY TO ROTATE.

- 3.) Press the alignment light push button.
- 4.) Verify that the gantry rotates.
- 5.) Turn off the laser light.
- 6.) Perform a 2-second X-ray OFF scan.

NOTICE

During the scan, it may be necessary to enter the scan room to obtain a better listening position. If so, keep a finger on one of the four E-STOP buttons (on the gantry), to quickly stop the gantry, if necessary.

- a.) From the console, click on the SERVICE DESKTOP icon.
- b.) Select DIAGNOSTICS.
- c.) Select DIAGNOSTIC DATA COLLECTION
- d.) Set the scan time to 4.00 seconds and rotating X-ray Off.
- e.) Select ACCEPT.
- f.) Leave the door open. (This makes it easier to hear any loose or interfering parts.) The gantry should spin for approximately 45 seconds
 - * Listen for any interference between the rotating and stationary parts.
(Correct any interference problems.)
 - * Listen for any loose parts.
(Tighten parts as needed.)
- g.) After completing the 4-second scan, repeat Step a through Step f, with the following scan times:
 - * 2.0 second scans
 - * 1.0 second scans
 - * 0.7 second scans
 - * 0.5 second scans
- 7.) Confirm all enabled switches are on then install removed covers.

6.8 Install PDU Covers

6.8.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|--------------------------|--------------|
| 1 (FE or mechanical supplier) | | 10 minutes labor on-site | |

6.8.2 Tools and Test Equipment

- Medium +blade screw driver
- Medium -blade screw driver

6.8.3 Procedure

- 1.) Confirm that the plastic safety shield is still in position and secured to the PDU.
 - If it is not, install the shield using the remover hardware.
 - Position the front cover so that the bottom is resting on the two guide pins located on the bottom of the PDU chassis.
- 2.) Raise the cover into place and use the two thumb screws on the top of the front cover to secure it. Screws should be tight, but do not over tighten them.
- 3.) Place the top cover on the PDU.
- 4.) Slide the cover toward the front of the PDU until the cover latches.
Using a +blade screw driver, tighten the screws. Do not over tighten them.

6.8.4 Emergency Stop Check

- 1.) Use the gantry push-buttons to advance the cradle about 0.5m (2ft) from the home position.
- 2.) Press one of the E-STOP buttons on the gantry.
- 3.) Make sure the TABLE POWER shuts off, and the green LED flashes.
- 4.) Depress one of the table elevation buttons, to verify the emergency stop disabled table elevation.
- 5.) Depress one of the cradle drive buttons, to verify the emergency stop disabled the cradle drive.
- 6.) Press one of the **RESET** buttons to turn on X-RAY DRIVES POWER. (120 VAC LED stops flashing.)
- 7.) Press the other E-STOP button on the gantry.
 - a.) Make sure the Table Power shuts off.
 - b.) Manually move the cradle to the home position to make sure the cradle clutch released.
 - c.) Make sure the cradle latches securely in the home position.
- 8.) Press one of the **RESET** buttons to turn on X-RAY DRIVES POWER.
- 9.) Press one of the four table tape switches to make sure the table down motion stops. Repeat with the three remaining table tape switches.
- 10.) Press the console emergency stop switch; make sure the Table Power shuts off.
- 11.) Press one of the **RESET** buttons to turn on X-RAY DRIVES POWER. (See [Figure 4-22](#)).



Figure 4-22 Reset buttons on Gantry Switch

Note: Emergency Stop buttons are located on the front of the gantry (2 in all), as noted in [Figure 4-23](#). Additionally, emergency stop buttons are provided on the Operator Console GSCB and PDU (see [Figure 4-24](#)).



Figure 4-23 Gantry Emergency Stop Button Positions



Figure 4-24 GSCB Emergency Stop Button

Section 7.0 Mechanical Installation Completion Checklist

System-Level

- ☐ FE Service cabinet moved to the location shown on the site print
- ☐ All covers installed and aligned
- ☐ All options installed on the table and gantry
- ☐ All packing materials and boxes returned to the lean cart
- ☐ All service items placed in the service cabinet.

Optional and Regional

Seismic mounting installed, if required in your area.

Site Clean Up

- ☐ All customer items placed on a cabinet or on a counter and labeled customer material.
- ☐ All system service tools placed in the GE service cabinet.
- ☐ System software and options left on the lean cart in the software tray
- ☐ System cleaned and nicks repaired
- ☐ Installation site cleaned and all trash properly disposed.

Dolly Return

- ☐ Return of dollies and lean carts arranged for and pick-up made.

Paperwork

- ☐ Mechanical installation section of the GE Form e4879 completed
 - √ Room information recorded on the GE Form e4879
 - √ Table gantry alignment completed per the installation manual
 - √ Table gantry anchoring completed per the installation manual
- ☐ GE Healthcare personnel notified that the mechanical installation is completed
- ☐ All installation issues have been addressed and or documented so FE can follow-up as needed.

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Appendix A

Gantry Cover Removal and Dolly Setup

Section 1.0 Gantry Cover Removal

NOTICE Follow ALL required safety and PPE procedures customary for your organization, when working on this product.

1.1 Time & Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|------------------|------------------|-----------|--------------|
| 1 | Not Applicable | | |

1.2 Tools and Test Equipment

- Front and rear cover dollies
- Hex wrench set

1.3 Procedures

1.3.1 Gantry Scan Window



CAUTION Potential for Equipment Damage. The cones of the front and rear gantry covers must be aligned within specification to ensure proper scan window fit. If the scan window is not fit properly, fluids can get into the collimator and detector, causing image artifacts or permanent damage.

This procedure assumes the front and rear covers are installed.

- 1.) Grab the window at the top and pull firmly downward.
- 2.) Pull the scan window down from the top center and then grasp both sides of the scan window, move them together and lightly pull upward, until you can free the window from between the front and rear covers. See Figure A-1.

Note: You may need to use the tip of a flat blade screwdriver to pull down the top edge of the scan window away from the cover in order to grab it with your fingers. Be careful not to push the screwdriver in too far as the gasket can be damaged.



Figure A-1 Scan Window Removal

1.3.2 Side Cover Removal

- 1.) If removing side cover in preparation for front cover removal, move the table to its lowest position before powering off gantry.

CAUTION



Shock Hazard

Voltage Present

No service on left side while energized.

- 2.) Use an 8mm Hex wrench to unlatch the side cover from the front cover. See [Figure A-2](#).

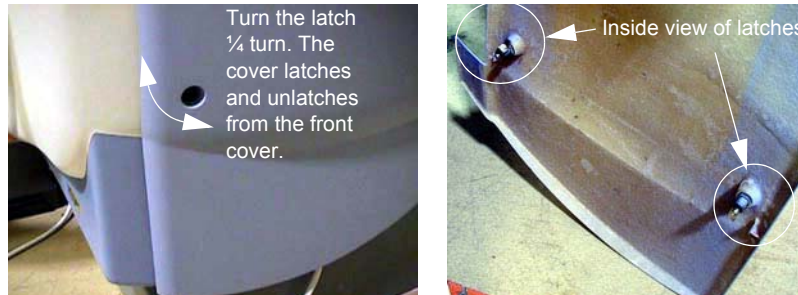


Figure A-2 Side Cover Latches

- 3.) Remove the right side cover by lifting it upward to release the two (2) latches, located on the top edge of the cover. See [Figure A-3](#). Once removed, the service switches should be exposed.

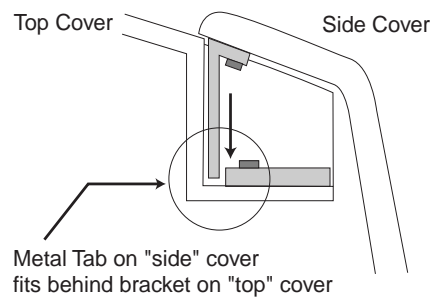


Figure A-3 Side and Top Cover Clasp

- 4.) Turn OFF the three (3) main power switches (HVDC, 120VAC, and Axial Drive) on the Service

Switch Panel (SSP) as applicable for the service being performed. See [Figure A-4](#).

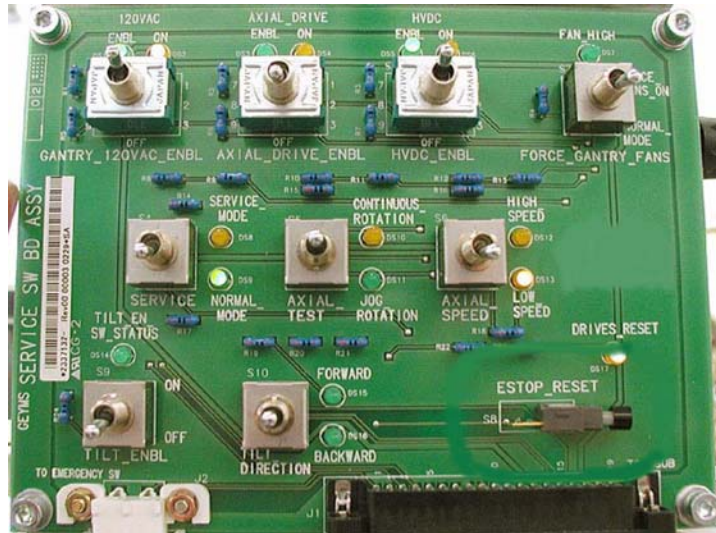


Figure A-4 Service Switch Panel

5.) Repeat Steps 1 and 2 for the left side cover.

1.3.3 Top Cover Removal

CAUTION Potential for Shock.



Voltage may be present. Potential for injury if covers removed and power is left ON. Always remove the right side cover first, and turn OFF power at the service switches.

NOTICE



1.) Remove the gantry right side cover.

Always turn OFF the HVDC before the 120 VAC. Turning OFF 120 VAC power before HVDC power can result in equipment damage.

2.) Turn OFF the three (3) main power switches (HVDC, 120VAC, and Axial Drive) on the Service Switch Panel (SSP) as applicable for the service being performed. See [Figure A-5](#).

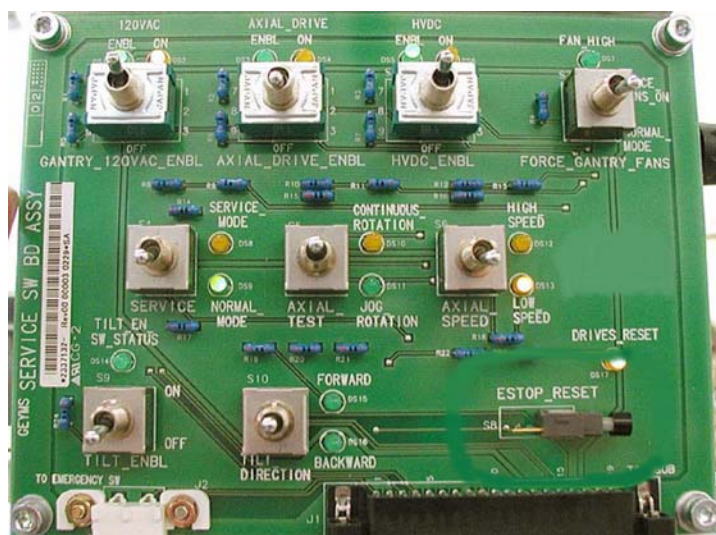


Figure A-5 Service Switch Panel

- 3.) Unscrew two screws that secure the top cover with Philip top screwdriver.



Top cover
Screws

Figure A-6 Screws Securing Top Cover

- 4.) Take the end of the top cover nearest to the side cover and tilt upwards.
- 5.) Slide the cover down to disengage the tab from the mounting bracket.



Figure A-7 Top Cover Tabs and Bracket

- 6.) Lift the cover clear and repeat the above steps for the other cover.

1.3.4 Gantry Front Cover

NOTICE Potential for cover damage.



Front and rear cover removal and installation can be safely accomplished by one (1) person using the dollies provided with the system. Failure to use these dollies will significantly increase the likelihood of damage to the covers. Do not lean covers against walls.

Front Cover Dolly Setup

DANGER



EQUIPMENT TIP HAZARD

DO NOT USE DOLLIES ON UNEVEN SURFACES SUCH AS STEPS OR ELEVATOR THRESHOLDS. THE DOLLIES ARE DESIGNED TO BE USED ON FLAT LEVEL FLOORS WITHIN THE SCANNING SUITE ONLY. MISUSE CAN RESULT

**IN PERSONAL INJURY OR DAMAGE TO COVERS OR OTHER FACILITY ITEMS.
ONLY USE DOLLIES ON FLAT SURFACES..**

CAUTION



Rotating arms on the stand are supposed to be stiff. If they fall freely, tighten the tensioning nuts. Loose rotating arms will reduce the stability of the dollies when supporting the front cover. Do not lubricate.

- 1.) Arrange Dolly sections for assembly. The base and post can be assembled only one way.
Refer to [Figure A-8](#) and [Figure A-9](#).
 - The base uses two (2) palm screws to clamp the four (4) legs in the open or usage mode.
 - The base also uses the same palm screws to prevent the legs from falling in storage mode.
 - The top post can be inserted in either base and is keyed for proper engagement.
 - The top post locking pin prevents the sections from separating during usage.

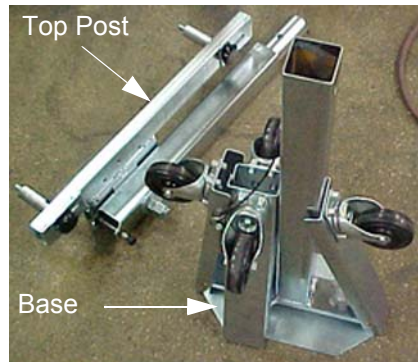


Figure A-8 Front Cover Dolly in Storage Mode

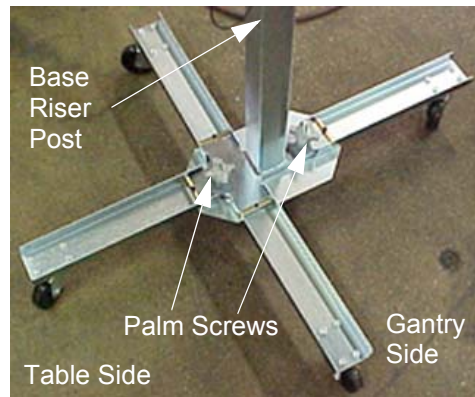
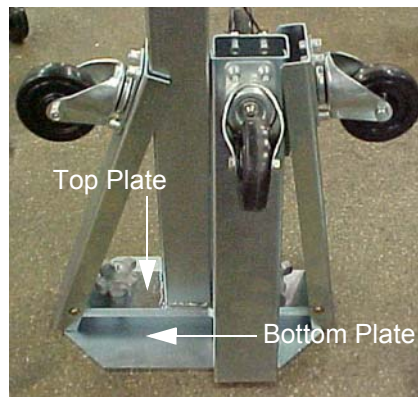


Figure A-9 Front Cover Dolly Base Assembly

- 2.) Unfold the base legs by loosening both palm screws to the top of their travel.
- 3.) Carefully unfold the legs so that the castors touch the floor.
- 4.) Tighten the palm screws to clamp the legs between the base top and bottom plates.

Note:

Lifting the base by the riser post while leaving the castors on the floor will ease palm screw tightening. Reference [Figure A-9](#).

WARNING



EQUIPMENT TIP HAZARD

**COVER DOLLIES MAY TIP OVER IF NOT CONFIGURED PROPERLY.
ENSURE BOTH PALM SCREWS ARE TIGHTENED SECURELY AND THE LEGS
ARE CLAMPED TIGHTLY BETWEEN THE BASE TOP AND BOTTOM PLATES.**

FAILURE TO DO SO WILL RESULT IN INSTABILITY DURING FRONT COVER HANDLING.

- 5.) Insert top post into the base riser post. Align the key for complete engagement.
- 6.) Insert top post locking pin to secure both top and bottom sections.
- 7.) Reverse above steps to disassemble.

Note: For base storage only one (1) palm screw needs to be tightened. This will engage the bottom base plate and the leg ends preventing the legs from unfolding during transport and storage.

Removal

- 1.) Position the table at its lowest position.

NOTICE



Always turn OFF the HVDC before the 120 VAC. Turning OFF 120 VAC power before HVDC power can result in equipment damage.

- 2.) Remove gantry side and top covers, if you have not already done so.
- 3.) Verify the three (3) power switches have been turned **OFF** (see [Figure A-10](#)).

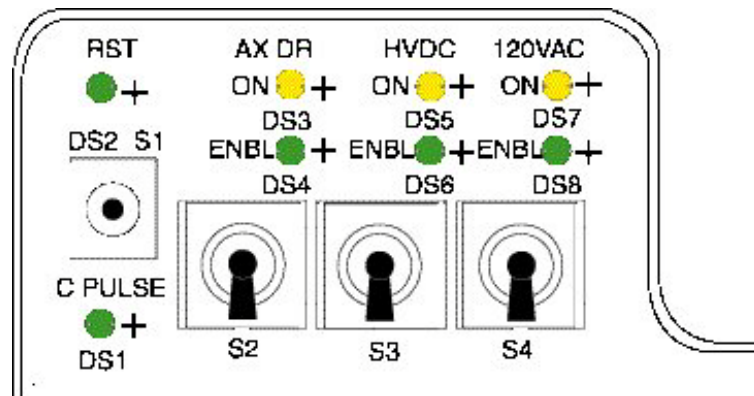


Figure A-10 STC Power Switches

- 4.) Verify the three (3) power switches have been turned **OFF** (see [Figure A-11](#)).

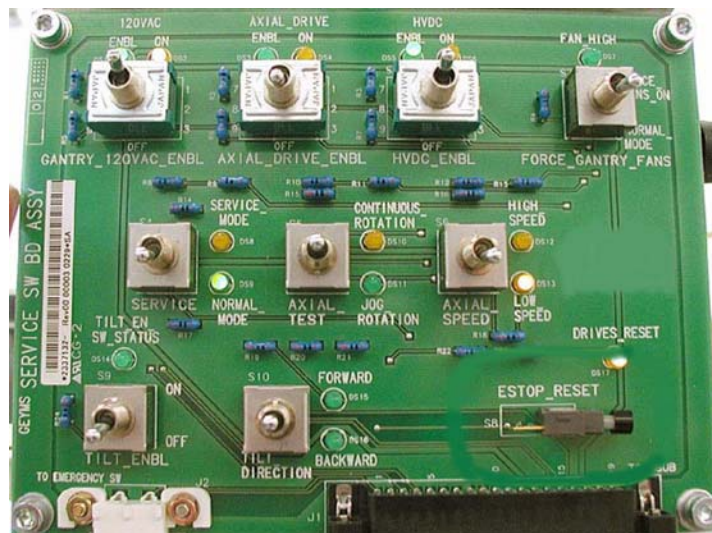


Figure A-11 Service Switch Panel

- 5.) Assemble the front cover dolly.
 - a.) Tighten the two (2) shoulder bolts to the gantry securely. This makes cover installation easier (see [Figure A-12](#)).

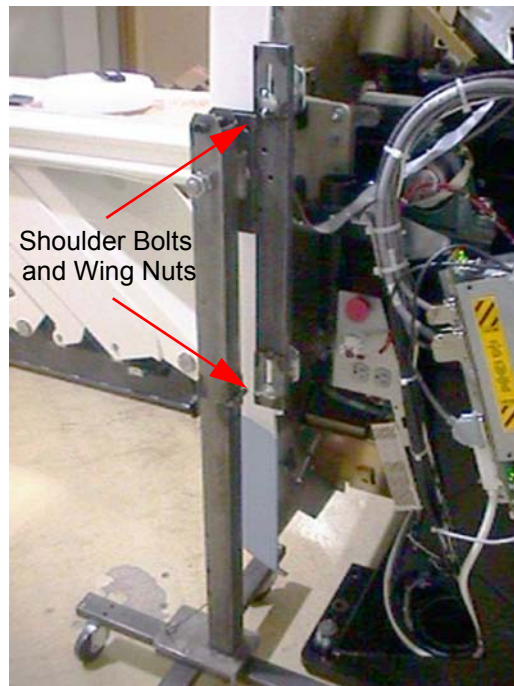


Figure A-12 Front Side Dolly

- b.) Attach side dolly to the shoulder bolts and secure assembly with two (2) wing nuts.
 - c.) Repeat steps a and b to assemble the other side dolly.
 - 6.) Detach front cover J1 and J3 and LAN cables.



Figure A-13 Front Cover Cables

- 7.) Remove the Mylar (scan) window.
- 8.) Remove front cover.
 - a.) Disengage upper cantrell bracket on right side of the cover.

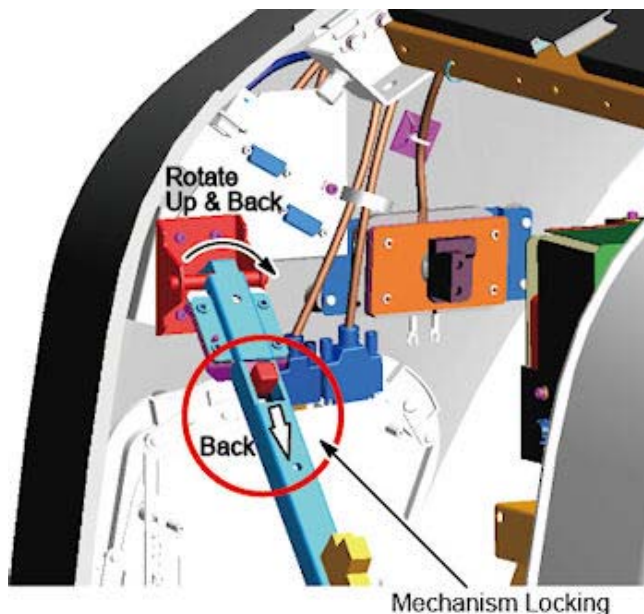


Figure A-14 Releasing Cover Brackets

- A.) Disengage the locking mechanism on the upper cantrell brackets by using your thumb to slide the trigger (red lever) back. This will release the locking mechanism and allow the cantrell to be rotated upwards with steady and firm pressure.
- B.) Disengage the rubber retaining straps on right side. See [Figure A-15](#). You may find it helpful to lift "up" on the cover to align the stud while attaching the rubber retaining straps.

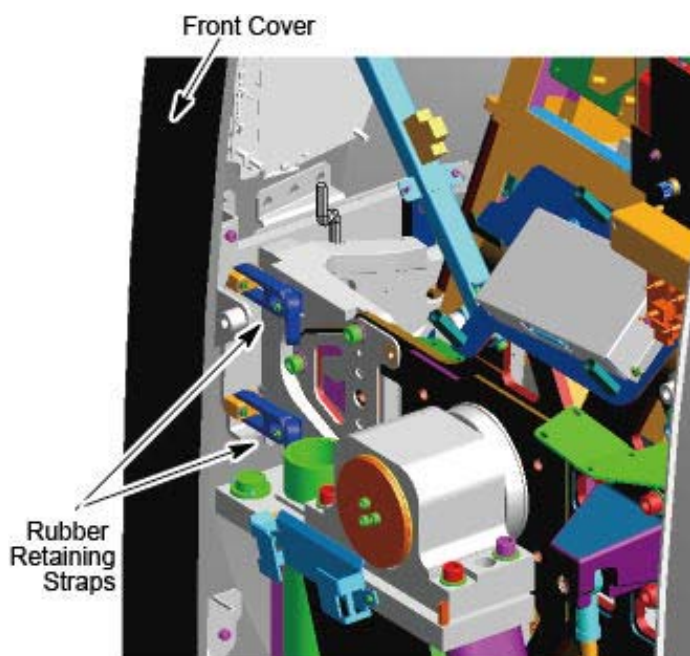


Figure A-15 Rubber Retaining Straps and Cover Locking Mechanism

- b.) Disengage the left side of the front cover.
 - A.) Remove the small cover from the front cover.
 - B.) Loosen M12 screw.

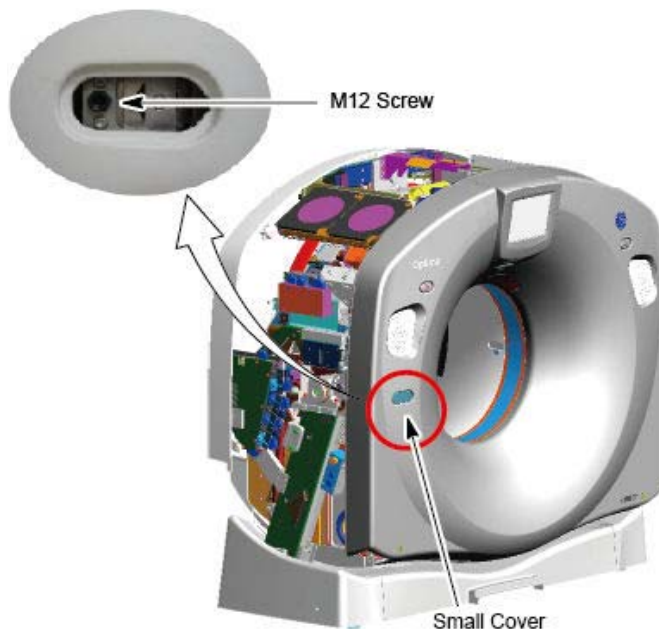


Figure A-16 Disengage the Left Side of the Front Cover

- 9.) Rotate front cover away from gantry.
 - a.) Move front cover away from gantry, leaving space (about 5 feet) between cover and gantry.
 - b.) Pull the locking pin and rotate front cover away from gantry. Place locking pin in one of the side dolly perforations (see [Figure A-17](#)).



Figure A-17 releasing Front Cover Dolly Hinge

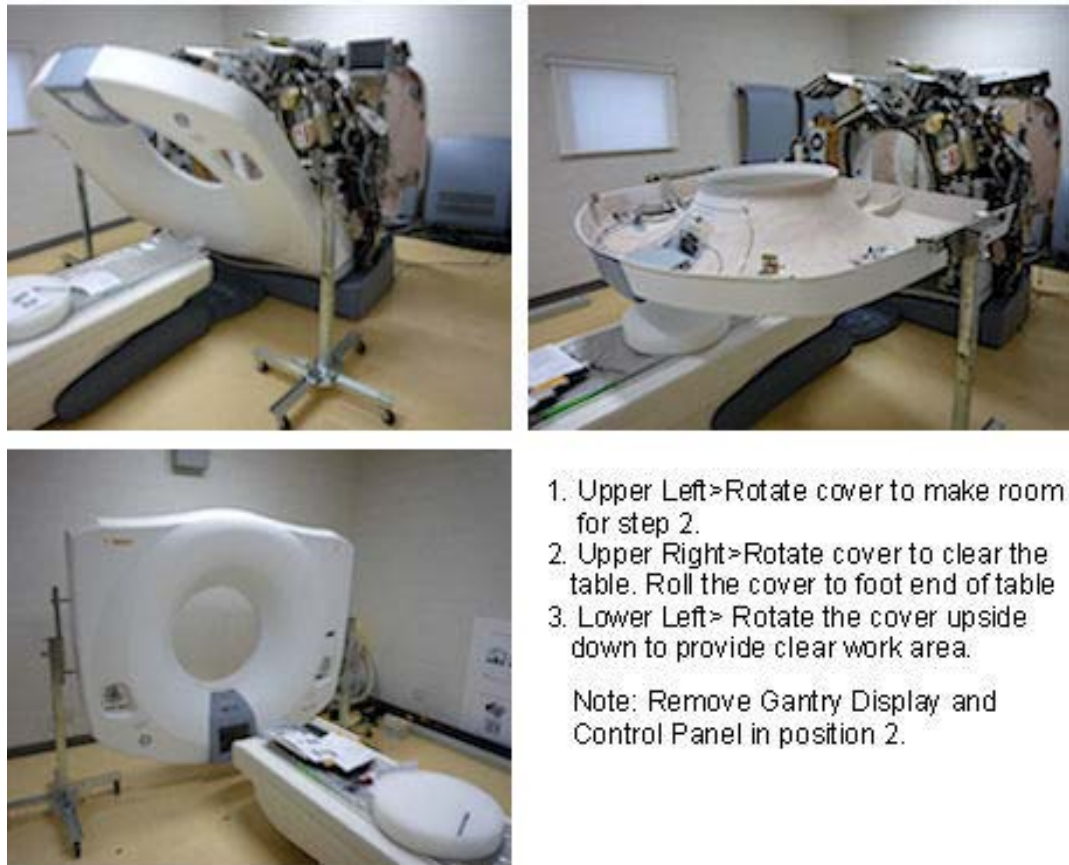


Figure A-18 Front Cover Removal Sequence

- 10.) Rotate the cover horizontally and move it back and over the table to a safe location. Once in a safe location, you may over-rotate the cover full vertically but upside down.
- 11.) Remove the gantry display from the front cover and place it into its service position if scan is required during maintenance.
 - a.) The gantry display is held in place with (6) thumb screws. Use a flat-blade screwdriver to

remove the Display (see [Figure A-19](#)).

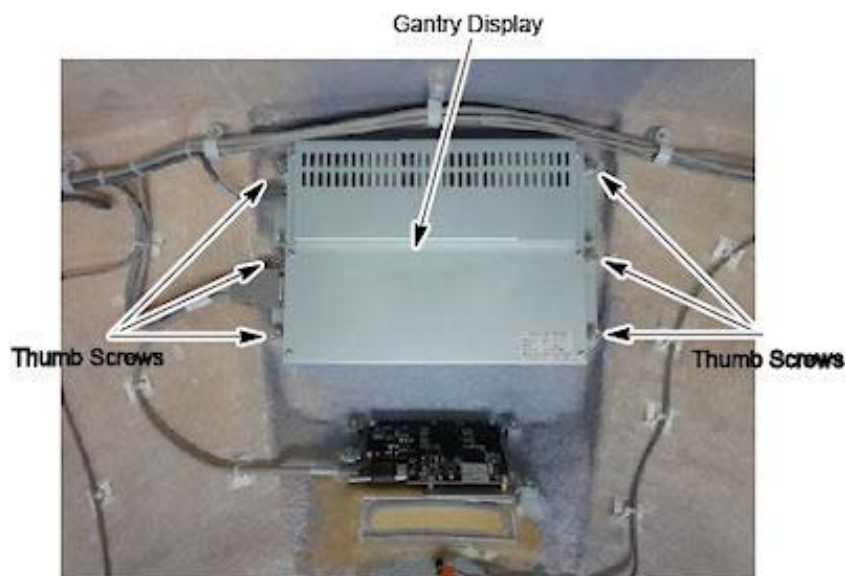


Figure A-19 Gantry Display Removal

b.) Loosen two lock screws of the rear cover.



Figure A-20 Lock Screws of the Rear Cover

c.) Side the rear cover backward.

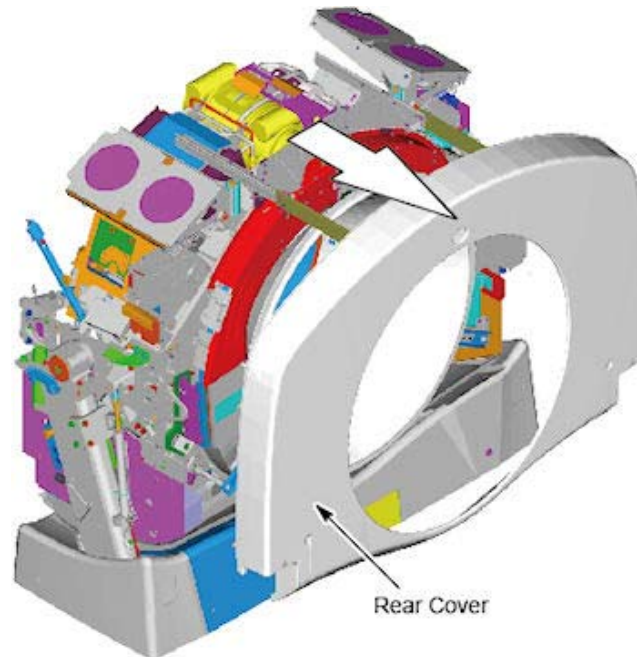


Figure A-21 Rear Cover Slide

d.) Loosen the lock screw of the right top fan of the gantry, and rotate the right top fan.

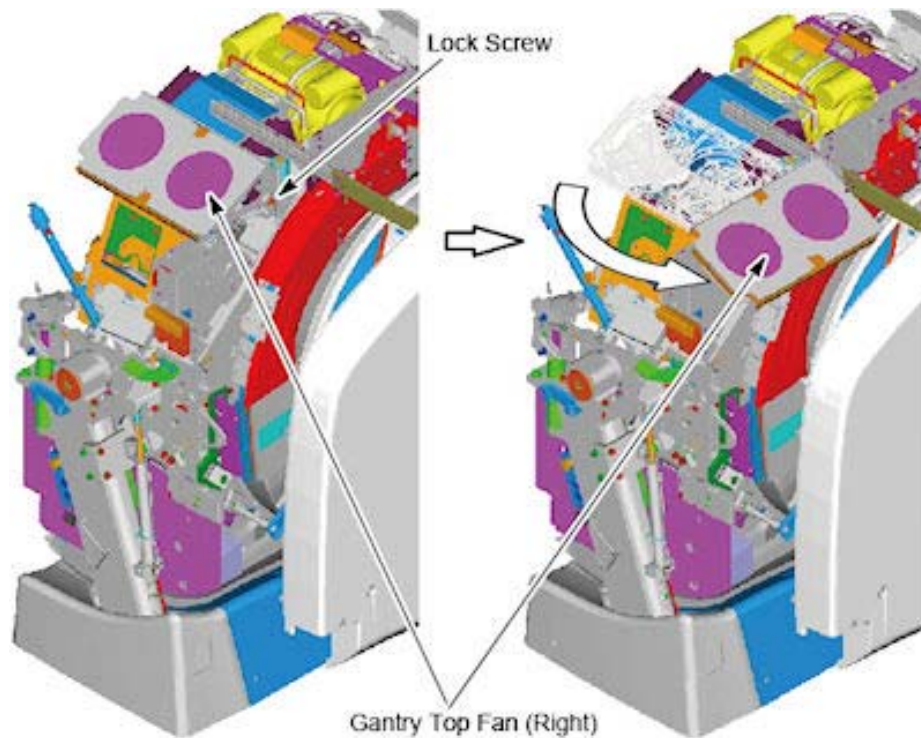


Figure A-22 Top Fan Rotation

- e.) Place the Display in the bracket on the right side of the gantry. (see [Figure A-23](#))



Figure A-23 Gantry Display Service Mounting Location

- 12.) Remove right gantry control assemblies, and place it into its service position.
- Loose five (5) screws that fasten the control panel to the cover. See [Figure A-24](#). Keep one hand on the control panel at all times to prevent it from dropping to the floor.
 - Set dip switch s19-4 to ON position.

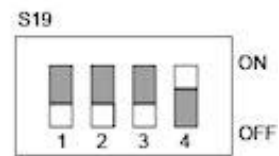


Figure A-24 Dip Switch S19 - 4 Setting

- c.) Align the ball studs with their associated receivers and snap into place.

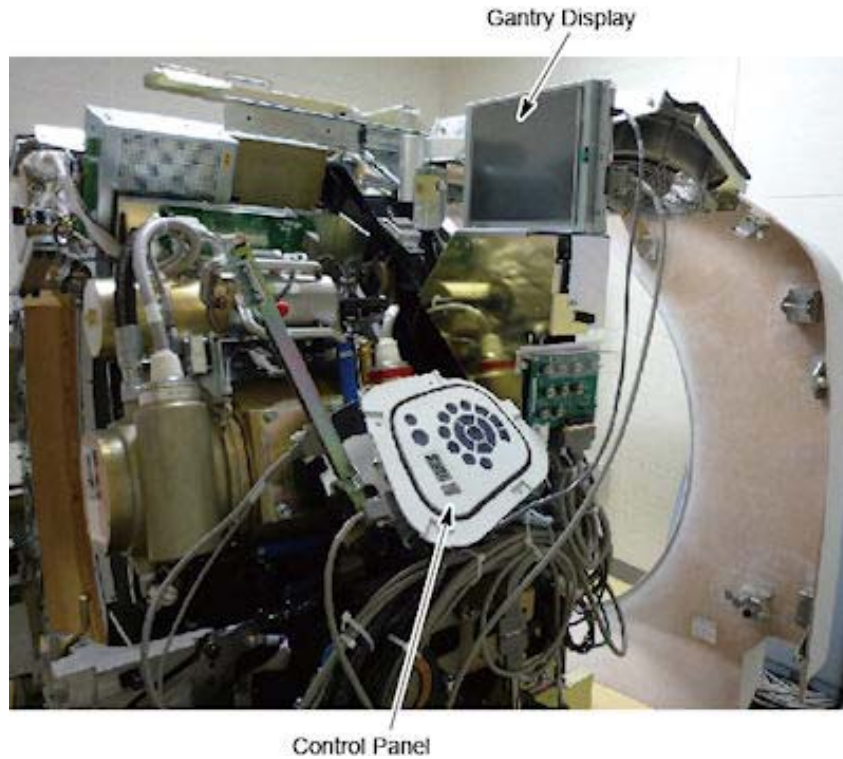


Figure A-25 Control Panel Service Position

- d.) Connect FCVR BKHD J1 cable to terminator located on the cantrell arm. See [Figure A-26](#).



Figure A-26 Gantry Service Mode Cable Terminator

- e.) Connect the FRT CVR J3 cable to the extension cable 5369987 and connect the other

end of the connectors to display and control panel.

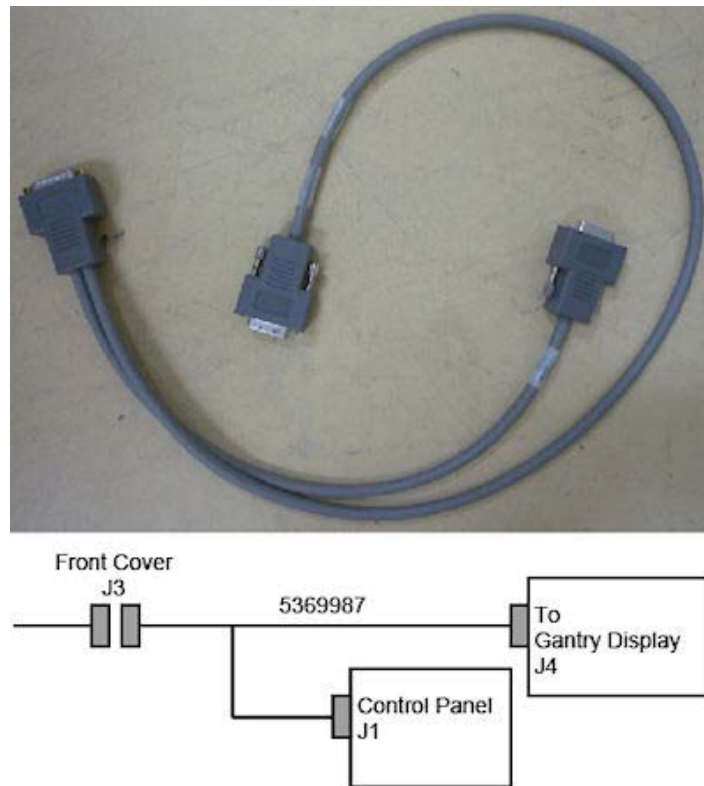


Figure A-27 FRT CVR J3 Cable

1.3.5 Bore Cover Removal

- 1.) Remove gantry side covers, top covers and Mylar window. Refer to each cover's removal procedure.
- 2.) Remove gantry rear and move away from the gantry. Refer to Gantry Rear Cover Removal procedure.
- 3.) Disconnect the Breath Navigator I/F cable and MIC REAR T-SW I/F cable from the top of the bore cover.



Figure A-28 Breath Navigator I/F Cable

- 4.) Remove the 2 screws located at two bottom brackets of the bore cover. Then loosen the screw on top. (Refer to [Figure A-29](#))

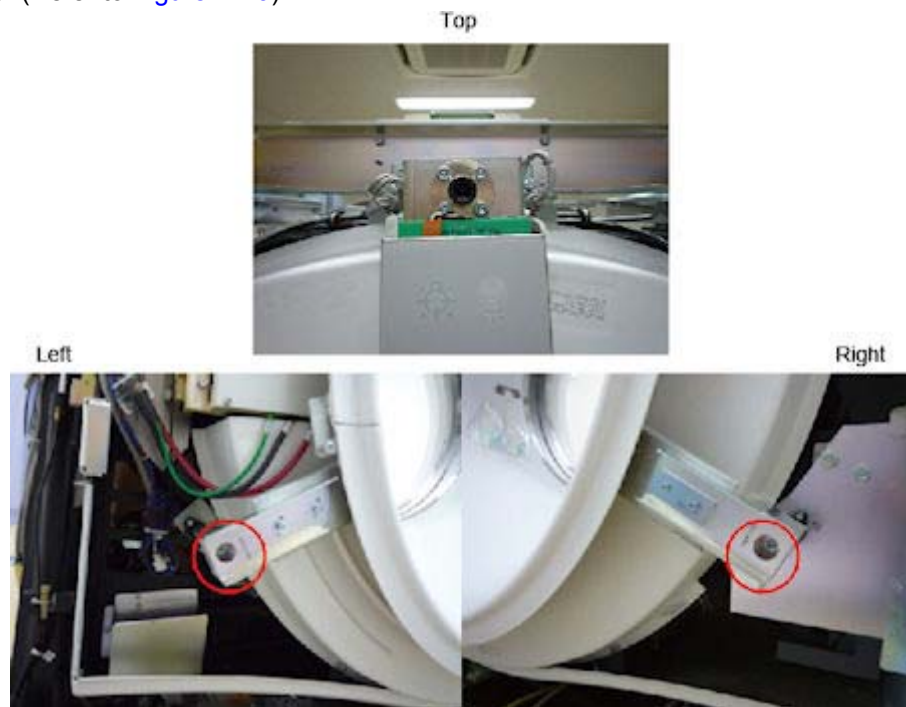


Figure A-29 Screws of Bore Cover

- 5.) Pull up safety pin small knob on the bore cover top bracket and rotate 1/4 turn to keep the safety pin disengaged.



Figure A-30 Safety Pin

- 6.) With two persons, pull out the bore cover from the gantry stationary brackets and place it on the floor.

NOTICE Disable UIF communication after gantry bore cover removal, So if need UIF continuation, please insert the terminal to the Mic/T-SW I/F connector.

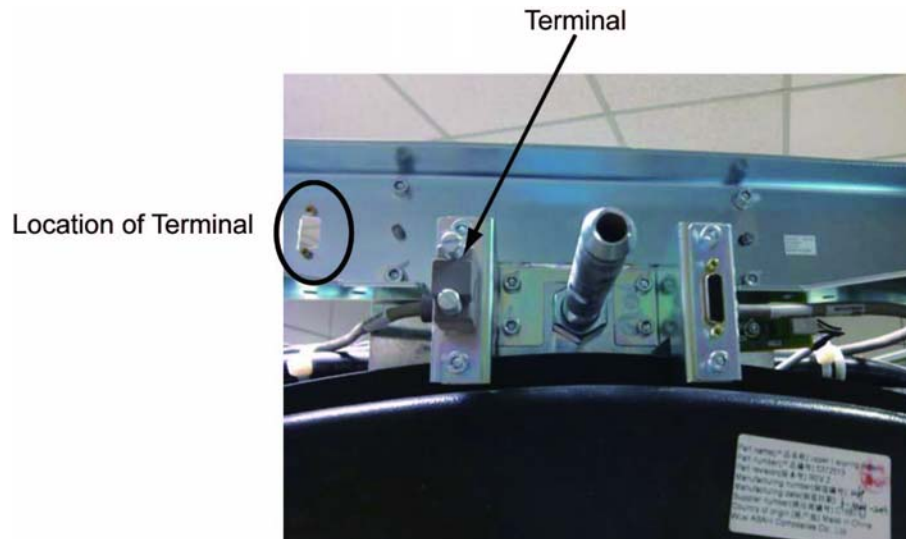


Figure A-31 Location of Terminal

1.3.6 Gantry Rear Cover

Sliding Out Rear Cover

DANGER



ELECTROCUTION HAZARD.

HIGH VOLTAGE PRESENT. POTENTIAL FOR INJURY IF COVERS REMOVED AND POWER IS LEFT "ON".

DISABLE ALL SERVICE SWITCHES PRIOR TO REMOVING REAR COVERS.

NOTICE



Always turn OFF the HVDC before the 120 VAC. Turning OFF 120 VAC power before HVDC power can result in equipment damage.

- 1.) Remove Gantry side covers, top covers and Mylar window.
- 2.) Use a 10mm Hex wrench to unlatch the rear cover.



Figure A-32 Rear Cover Unlatch

- 3.) Slide out the rear cover by pulling the cover backward.



Figure A-33 Rear Cover

Rear Cover Removal

CAUTION



Pinch Hazard

Uncontrolled cover movement

Make sure the wing nuts are tightened on the cover dollies prior to releasing cover from gantry mounts.

- 1.) Install the rear cover dolly.
 - a.) Tighten the two (2) shoulder bolts to the rear cover. Use the extending bolt for the upper side.
 - b.) Fit side dolly through the shoulder bolts and secure assembly with two (2) wing nuts.
 - c.) Repeat steps a and b for the other side dolly.
- 2.) Remove rear cover by removing 8 screws, which attach the rear cover to the brackets.



Figure A-34 8 Screws of Rear Cover



Figure A-35 Removed Rear Cover

- 3.) Move cover away from gantry as needed.

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Appendix B

Pictorial Representation of Required Tools

Use the following guide as a reference, if you are unsure of a tool listed in [Section 2.3, on page 27](#).

Table B-1 Required Tools











| TOOL NAME | PICTURE | EXAMPLE PART NUMBER* |
|-------------------------|---|---|
| Adapter |  | Sears Industrial: $\frac{3}{8}$ " to $\frac{1}{2}$ " (9-4258) |
| Ball-Peen Hammer |  | Sears Industrial: 1lb/2lb (9-38465) |
| Canned Air |  | Miller Stephenson: Aero Duster (MS-222N) |
| Clamp on Amp Meter |  | Sears Industrial: 9-WTAD105 |
| Combination Wrench Set |  | Sears Industrial: U.S. Standard & Metric (9-44048) |
| Cordless Screwdriver |  | Sears Industrial: 9-MU65401 |
| Deep Well Socket |  | Sears Industrial: $\frac{3}{4}$ " X $\frac{3}{8}$ " (included with 9-34496) |
| Dental Pick |  | |
| Diagonal Cutting Pliers |  | Sears Industrial: Small (9-45077) |

* Part Numbers given for reference only. GE Healthcare does not endorse any tool brand name.

Table B-1 Required Tools (Continued)








| TOOL NAME | PICTURE | EXAMPLE PART NUMBER* |
|--|---|--|
| Drill |  | Sears Industrial: $\frac{3}{8}$ " or $\frac{1}{2}$ " (9-27859) |
| Drill Adapter |  | Sears Industrial: 3" X $\frac{3}{8}$ " (9-APSZ24) |
| Drill Bit Set |  | Sears Industrial: U.S. Standard (9-66084) |
| DVM |  | Sears Industrial: 9-82028 Sears Industrial: 9-FL873 |
| Extension for Ratchet Wrench |  | Sears Industrial: 3" X $\frac{1}{2}$ " (9-44133) |
| Gloves |  | Sears Industrial: Large (9-40502) |
| Hammer Drill |  | Sears Industrial: $\frac{1}{2}$ " (9-27205) |
| Hex Bit Set |  | Sears Industrial: $\frac{1}{4}$ " (9-SK45508) |
| Hex Key (Allen Wrench) Set |  | Sears Industrial: U.S. Standard (9-46284) |
| * Part Numbers given for reference only. GE Healthcare does not endorse any tool brand name. | | |

Table B-1 Required Tools (Continued)

| TOOL NAME | PICTURE | EXAMPLE PART NUMBER* |
|---|---|--|
| Level |  | Sears Industrial: 4' (9-39856) |
| Masonry Bit |  | |
| Open-End Wrench (Thin or Standard Tappet) |  | Snap-on: 10mm (SRSM10) & 21mm (LTAM2124) |
| Pozi Screwdriver |  | |
| Ratchet Wrench |  | Sears Industrial: $\frac{3}{8}$ " (9-43175) |
| Reciprocating Saw with Blades |  | Sears Industrial: 9-MU650921 |
| Safety Glasses |  | Sears Industrial: 9-18650 |
| Safety Shoes |  | |
| Screwdriver Set |  | Sears Industrial: Phillips & Straight (9-41505) |
| Socket Set |  | Sears Industrial: Standard $\frac{3}{8}$ " (9-34496) |

* Part Numbers given for reference only. GE Healthcare does not endorse any tool brand name.

Table B-1 Required Tools (Continued)

| TOOL NAME | PICTURE | EXAMPLE PART NUMBER* |
|--|---|---|
| Sockets |  | Sears Industrial: 1 ¹ / ₈ " X 1 ¹ / ₂ " (9-47516) |
| Step Ladder |  | Sears Industrial: 6' (9-WN6006) |
| Tongue & Groove Pliers |  | Sears Industrial: Large (9-CL440) |
| Torpedo Level |  | Sears Industrial: 9" (9-39829) |
| Torque Wrench |  | Sears Industrial: ³ / ₈ " (9-WR3470) |
| Universal Joint |  | Sears Industrial: ³ / ₈ " (9-4435) |
| Vacuum Cleaner |  | Sears Industrial: 8 Gal (9-17780) |
| * Part Numbers given for reference only. GE Healthcare does not endorse any tool brand name. | | |

Appendix C

Operating Table Installation and Adjustment

Section 1.0

Smart Workspace Table Assembly and Adjustment

This section describe the Smart Workspace table assembly and adjustment procedure

- 1.) Remove all the transportation packaging from the Smart Workspace Table, use the packing material as cushion and carefully put tabletop on it to avoid scratches.
- 2.) Assembly the left and right legs to the tabletop by screwing 4 screws.

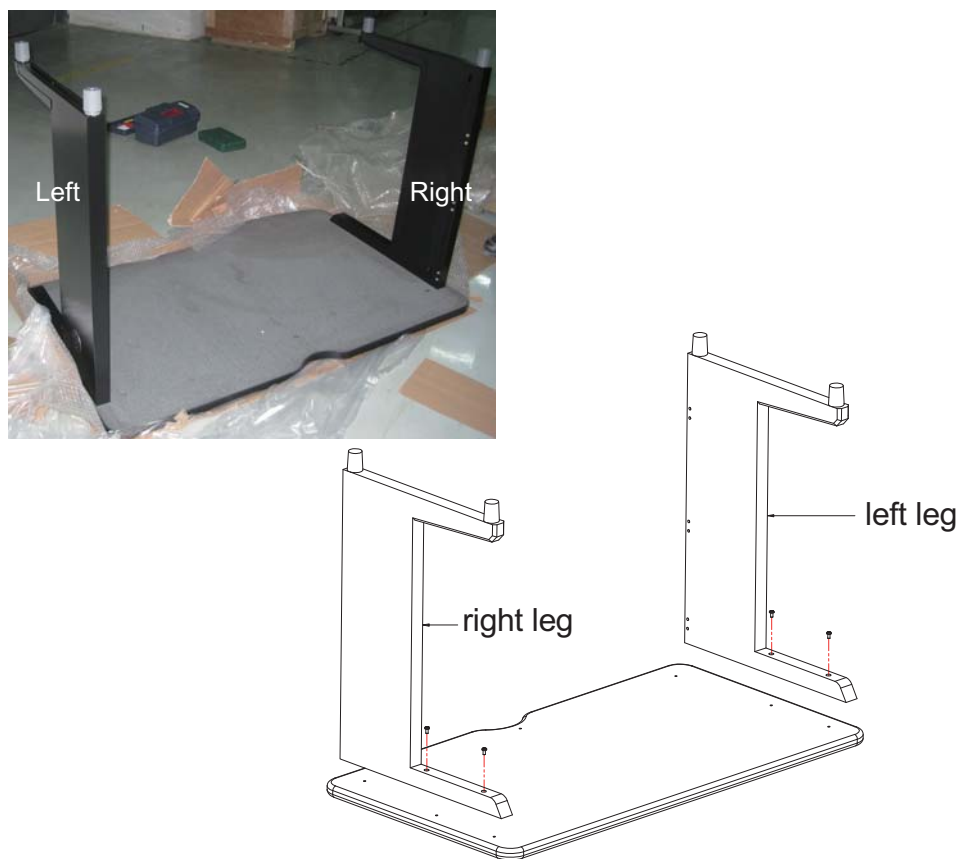


Figure C-1 Table Legs Installation

- 3.) Prepare crossbar and two beams.



Figure C-2 Cross and Beams

- 4.) Install the upper crossbar by screwing seven screws, three screws for tabletop, four screws for left and right legs.



Figure C-3 Crossbar Installation

- 5.) Install two beams to the left and right legs as shown in [Figure C-4](#). Note to keep all screws loose.

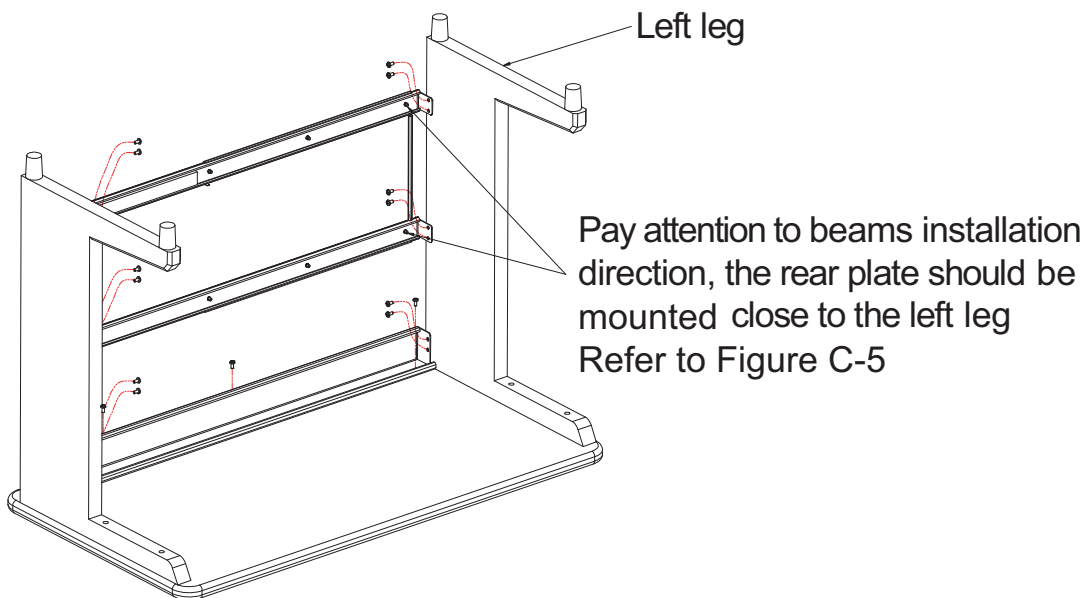


Figure C-4 Beams Installation

- 6.) Mount the rear plate on two beams by screwing 6 screws.

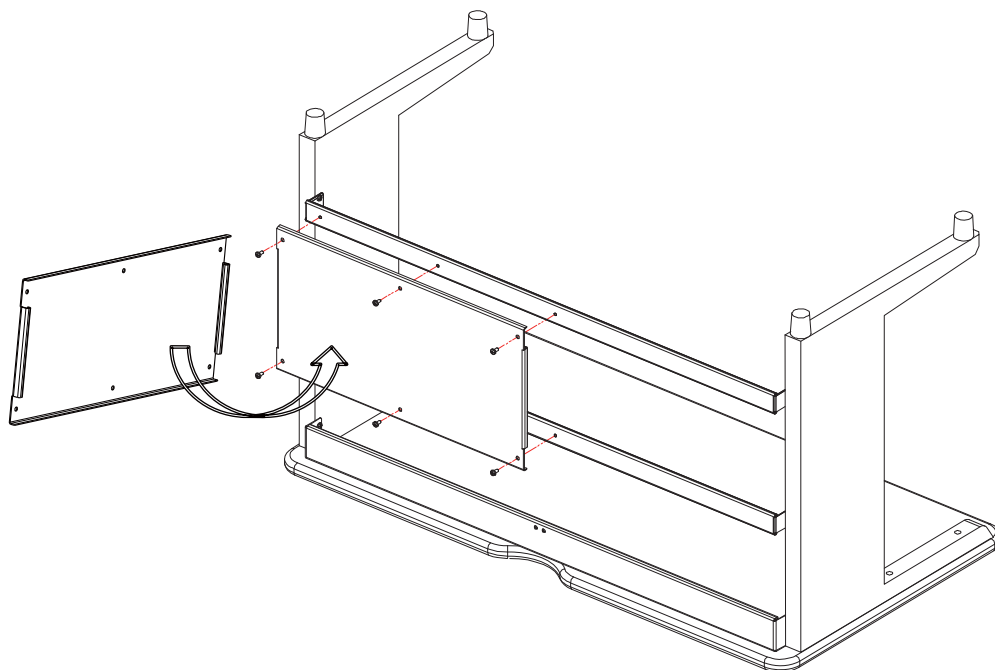


Figure C-5 Rear Plate Installation

- 7.) Tighten all screws.

- 8.) Stick EVA A on the teams and EVA B on the right leg as shown in [Figure C-6](#).

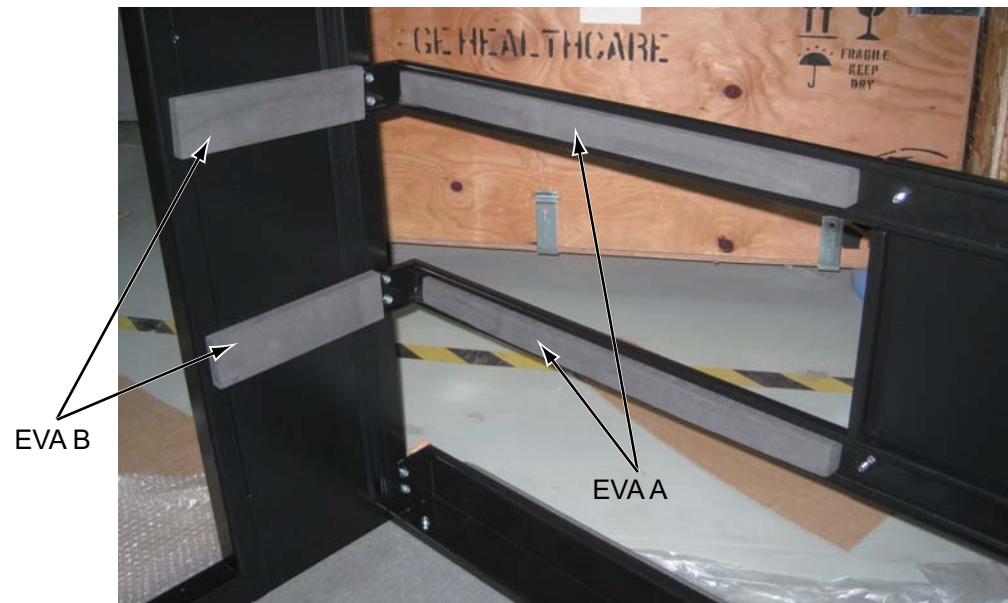


Figure C-6 EVA Attaching

- 9.) Overturn the table, then place monitors and route cables to the table.

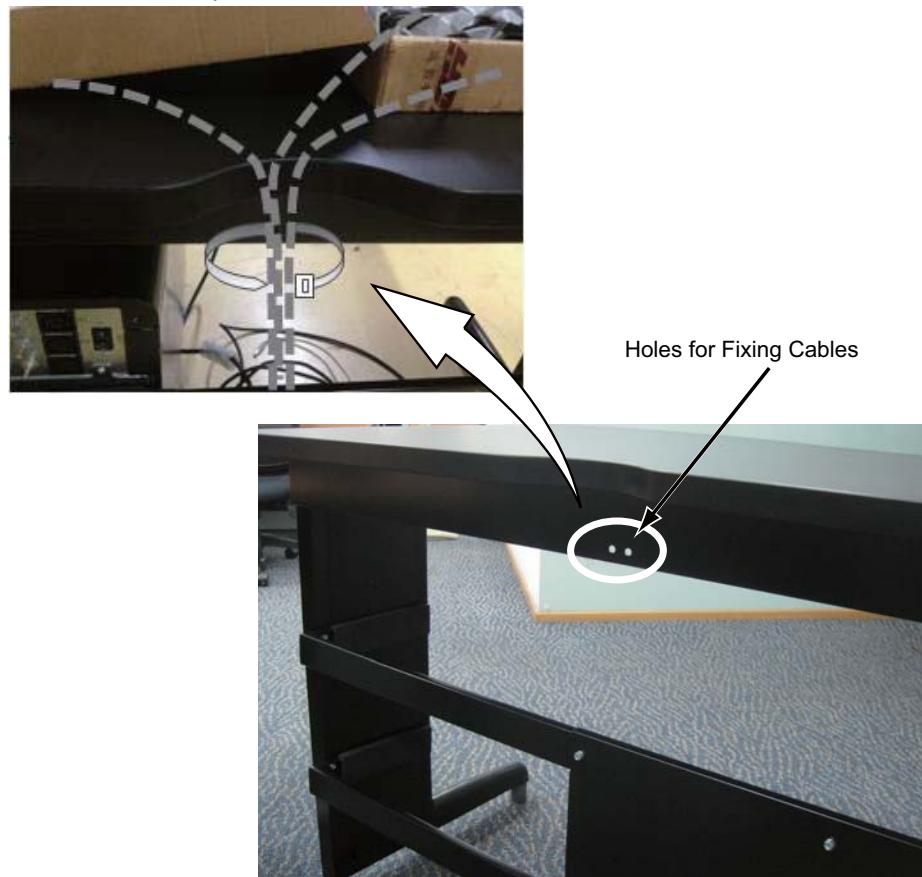


Figure C-7 Route cables to the table

Appendix D

Remote Monitor Option Console Wiring

Section 1.0

Remote Monitor Wiring Overview

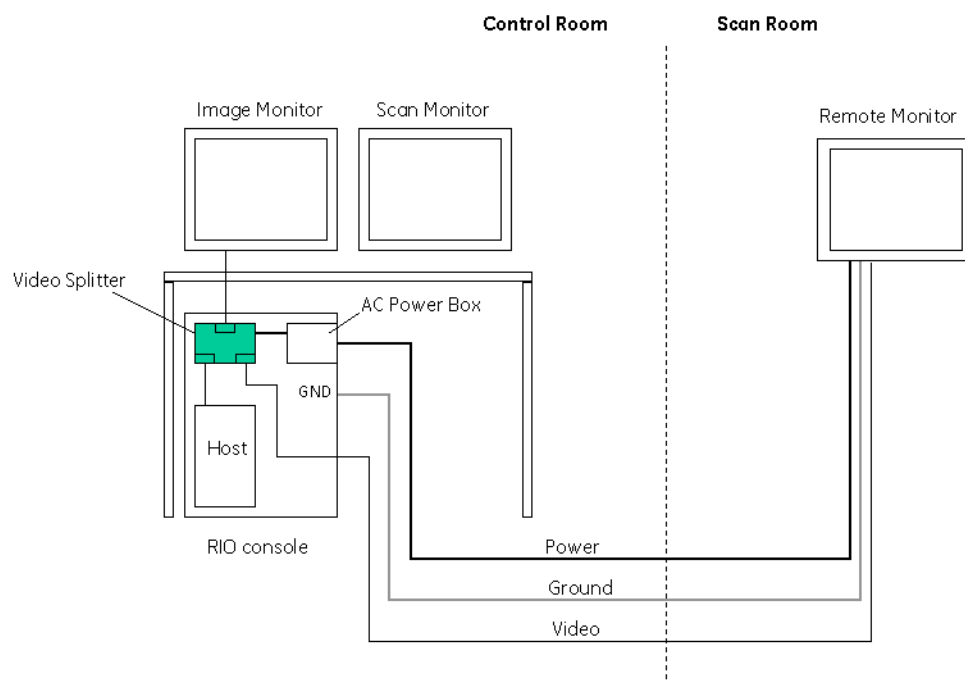


Figure D-1 Remote Monitor Wiring

Section 2.0

Wiring Installation

2.1 Power Down System



DANGER ELECTROCUTION HAZARD
HIGH VOLTAGES CAN CAUSE INJURY OR DEATH.

USE PROPER LOCKOUT/TAGOUT PROCEDURES AT THE “MAIN” DISCONNECT BEFORE WORKING ON EQUIPMENT.



CAUTION Do not apply power to the system until all work has been completed and all covers are in their proper place.

Before performing any of the installation procedures described in this section, do the following:

- 1.) After the customer has saved all information: Power down system.
- 2.) Perform LOTO at A1 breaker.
- 3.) Remove the front console cover, using a screwdriver for the two quarter-turn screws located on the console bottom. Screws may differ for your console type.
- 4.) Locate the console power panel.
- 5.) Remove the console back cover if required to install the splitter.

2.2 Install 4-Way Splitter

Follow the steps below to install the 4-way splitter.

Figure D-2 shows splitter connections when completed.

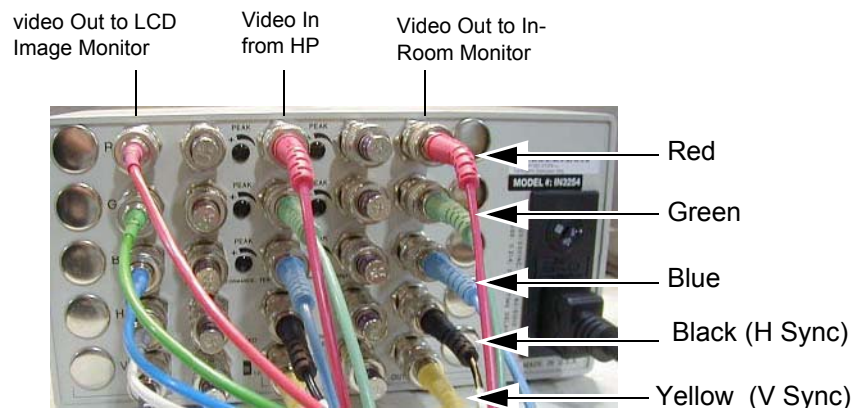


Figure D-2 4-Way Splitter Connections, Completed

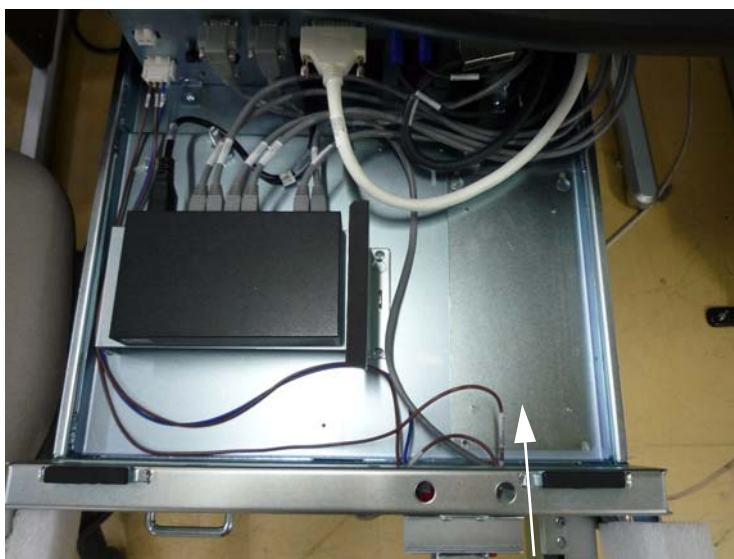
Note: The video cable connections shown in Figure D-2 apply to all 4-way splitters, even if the splitter itself appears different from that shown.

- 1.) Install the splitter:
 - a.) Remove Four rubber legs from the splitter.



Figure D-3 Removing Four Rubber Legs

- b.) Remove the splitter base plate from the console.



Splitter Base Plate

Figure D-4 Removing Splitter Base Plate

c.) Install the base plate to the splitter with the flat head screws.

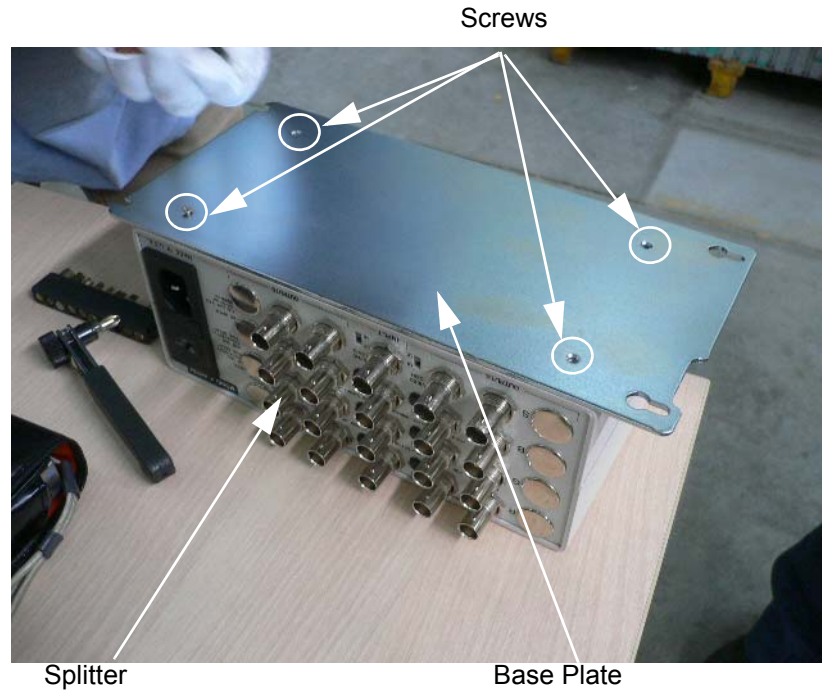


Figure D-5 Installing Base Plate

d.) Install the splitter with the base plate to the console.



Figure D-6 Installing Splitter

- 2.) With the monitor and computer switched off, remove the video cable from the back of the image monitor. See [Figure D-7](#). (The monitor shown below may appear different from the one you have.) Remove this cable from the HP computer video connector. Discard this cable. If the monitor has BNC connectors, remove them.

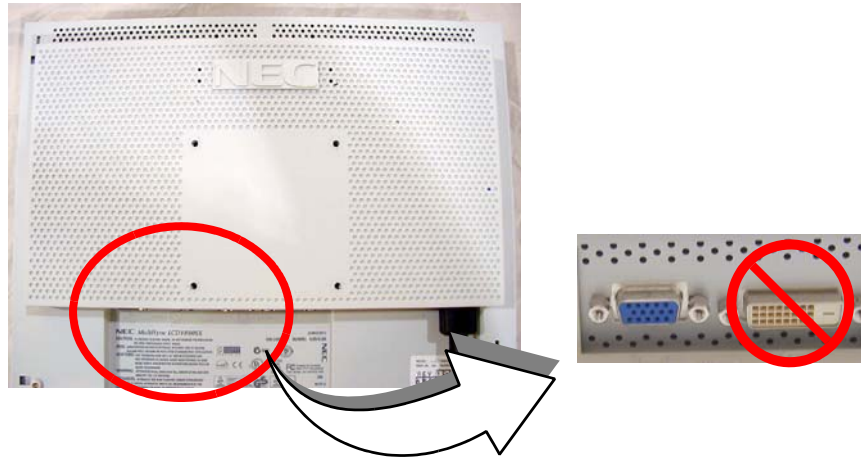


Figure D-7 Image Monitor (Your actual monitor may appear different from picture.)

- 3.) Connect the video cable to the HP computer video connector and then route the cable to the 4-way video splitter.
The kit has the required cable for the connection between the computer and splitter input.
Secure the cable with supplied tie wraps.
- 4.) Route the BNC end of the video cable to the center row of BNC connectors on the video splitter. Use caution when connecting BNC cables. Observe color codes and name on cables.



NOTICE

Potential for Equipment Damage. Touching the video signal cable connector pins may cause them to bend. When connecting the video signal cable, check the alignment of the HD15 connector. Do not force the connector in the wrong way.

- 5.) From the kit, select the second short video cable (the one that has a BNC on one end and HD15 on the other end) and connect this cable between the video splitter and the image monitor.
- 6.) Add the video cables to the video splitter output side. There should be five BNC connectors.
 - a.) Ensure the cables are attached to the video inputs (from above).
 - b.) Attach the cables from the desktop image monitor to the video outputs on the left.
 - c.) Attach the cables from the remote monitor to the video outputs on the right.

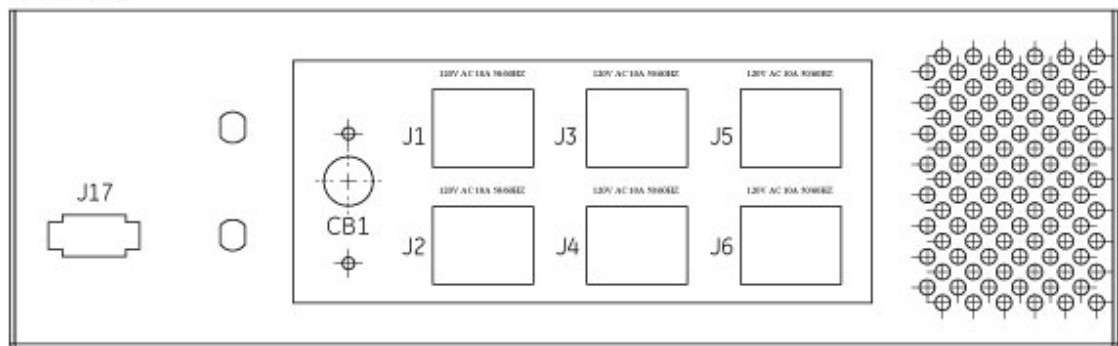
d.) Add BNC terminators to unused outputs.



Figure D-8 Splitter connections

- 7.) Set the Video Gain Level to 1.0 and the Sync Level to HI.
- 8.) Attach the AC power cable from the splitter to the J1 of the console AC Box. See [Figure D-9](#). Connect the remote power cord to J12.

Front View



Rear View

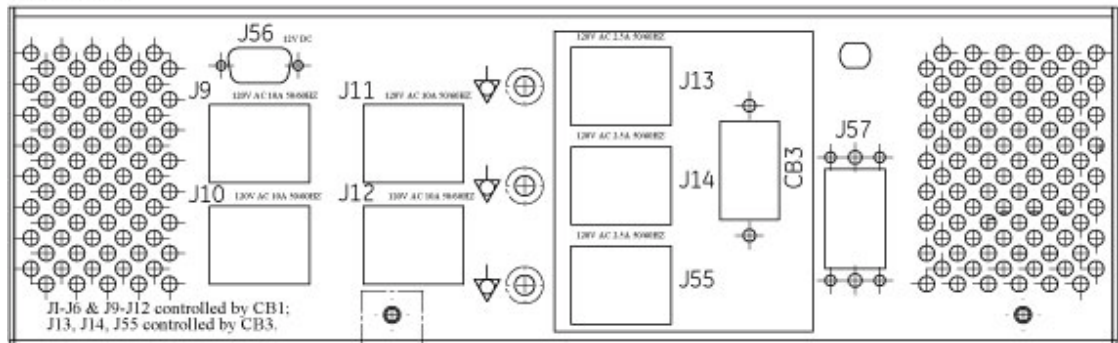


Figure D-9 AC Box J1 and J12

- 9.) Connect one end of the ground wire with the ring terminal to the ground stud on the back of the console.

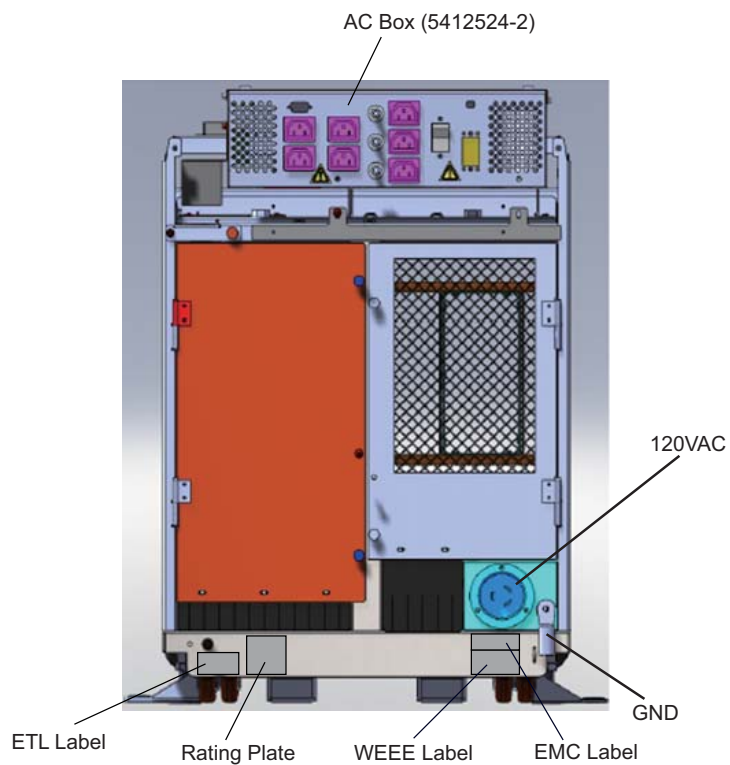


Figure D-10 AC Box Grounds

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Optima CT680 Series Installation Manual

(Book 2 of 2)



OPERATING DOCUMENTATION



5472001-1EN
Rev 2

Book 2 of 2: Electrical Calibration, Integration & Testing

Pages 205 - 292

Effectivity

The information in this manual applies to the following Optima CT Systems:

- Optima CT680 Quantum
- Optima CT680 Expert
- Optima CT680 Professional

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Chapter 5

Electrical Introduction

Section 1.0 Installer/FE Notices

Section 2.0 Introduction

Use the continuity and ground checks to verify that the system power connections have not shorted to ground and that the ground and neutral connections are intact.

Section 3.0 Review Mechanical Hand Off Material

- Complete the Mechanical Hand Off checklist:
- ☐ All options were installed. If not, contact your install specialist.
 - ☐ Check for short ships.
 - ☐ Complete paperwork and phone calls as needed.
 - ☐ Review cable connections with mechanical team.

Section 4.0 Calibration Training Requirements

See requirements outlined in Book 1.

Section 5.0 Required FE Common Tools and Supplies

| TOOL | COMMENT |
|-----------------------------------|----------------------------|
| Standard FE Tool Kit | See new tool list |
| Fluke 87 DVM or equivalent | must be calibrated yearly. |
| AC Clamp-on amp meter | must be calibrated yearly. |
| Dale 600 or 601 | must be calibrated yearly. |
| QA Phantom and phantom holder | |
| Lockout/Tagout kit, or equivalent | |
| Safety Glasses | |

Table 5-1 FE Tools and Supplies

5.1 Safety Materials

Note: Items with “checks” (✓) are included in the Install Support Kit

- ✓ Lockout/Tagout kit, or equivalent
- Safety Glasses

5.2 Cleanliness

The system must not be located in, near, or around construction. The room should be clean and clear of construction dust and installation materials. Do not power on the system if requirement in Book 1, Chapter 1, Section 3.13



NOTICE NEVER USE AN ERASER TO CLEAN ANY PART OF THE DAS.

Section 6.0 Requirements/Assumptions

- The procedures in this manual are performed by an appropriately trained GE engineer.
- You need the Internet (IP) addresses the first time you execute a reconfig on the system.
 - When you connect the system to a network, contact the system administrator to obtain the IP addresses for all the computers in the suite.

Section 7.0 FE Workflow

- 1.) Review mechanical hand-off material. Check that the Mechanical section of GE Form e4879 is completed.
- 2.) Obtain required FE common tools and supplies.
- 3.) Perform electrical power-on and ground checks.
- 4.) Gather all customer information needed for reconfiguration.
- 5.) Perform computer integration.
- 6.) Complete Table/Gantry integration.
- 7.) Complete the calibration process.
- 8.) Perform tube warm-up and fast calibration.
- 9.) Complete tomographic plane indication.
- 10.) Check table/gantry alignment.
- 11.) Run image series tests.
- 12.) Run system functional test.
- 13.) Verify that all options were installed.
- 14.) Create system state DVD.
- 15.) Complete network connections.
- 16.) Perform Patient Touch Leakage test.
- 17.) Perform the CT System Chassis Leakage test, as required by local code.
- 18.) Complete installation and verification of any customer options.
- 19.) Complete and return GE Form e-4879 Installation Data Verification for all installations.

Section 8.0 Overview for Completing Installation

8.1 System-Level Tasks

Complete the tasks listed and check the appropriate box on the GE e-4879 form (explained in [Section 8.0 on page 213](#)).

8.1.1 General

- ☐ HVAC system is operational and environmental data reported on the GE e-4879 form.
- ☐ System realignments completed, if required.
- ☐ Broadband installed and operational.
- ☐ Power and ground audit completed.

8.1.2 Optional and Regional

- ☐ Seismic mounting kit installed, if required in your area.
- ☐ Generator recalibration completed, if necessary.
- ☐ Collimator recalibration completed, if necessary.

8.2 Site Clean-Up

- ☐ All DVDs for customer options placed in the GE service cabinet.
- ☐ All system software and service tools placed in the GE service cabinet.
- ☐ System cleaned and nicks touched up with paint.
- ☐ Room is cleaned and all trash disposed of properly.
- ☐ Room is cleaned and all trash disposed of properly.

8.3 Dolly Return

- ☐ Return of dollies arranged and dolly pick-up made.

8.4 Options

Check the appropriate box on the GE e-4879 form to verify the installation and proper functionality of all customer-ordered options.

- ☐ Injector installed and operational.
- ☐ Advantage Windows Workstation installed and functional tests completed.
- ☐ Advantage 4D installed and functional tests completed.
- ☐ Filming/Camera/DASM installed and operational.
- ☐ Modem installed and functional tests completed.
- ☐ UPS installed and functional tests completed.
- ☐ Network items installed and functional tests completed.
- ☐ Customer software options installed and operational.

- ☐ Teleradiology connections completed.
- ☐ Remote monitor installed and operational.
- ☐ Bar Code Reader installed and operational.
- ☐ Cardiac monitor and stand installed and operational.

8.5 Final Activities (Paperwork)

- ☐ GE e-4879 completed; see [Section 9.0](#). (Required for installations in ALL countries.)
- ☐ FDA 2579 completed; see [Section 9.0](#). (Required ONLY for U.S. installations.)
- ☐ Any PQRs or PSRs encountered have been reported.
- ☐ All FIMs for system completed, if necessary.
- ☐ All dispatching activities (03-04-10 codes) completed.
- ☐ Customer acceptance checks completed.
- ☐ System transfer completed and appropriate GE Healthcare personnel notified.
- ☐ All outstanding customer installation issues have been addressed.

Section 9.0 GE and Regulatory Forms

Field Engineers must complete and submit the documents listed in [Section 9.1](#) for ALL installations, regardless of the country. In addition, for installations performed within the United States, Field Engineers must ALSO complete and submit the documents listed in [Section 9.2](#).

9.1 All Countries

9.1.1 GE e-4879 Form

The Field Engineer should:

- 1.) Locate the GE e-4879 form on the Service CD.
- 2.) Complete the form.
- 3.) E-mail the completed form to the HHS Administrator.

9.1.2 Product Locator Cards

The Field Engineer should:

- 1.) Enter the Product Locator Card information on the Product locator Website. Go to the following address to access the site: http://gib.gehealthcare.com/gib/gib_entry.jsp
- 2.) Leave one (1) Product Locator Card (or a copy) at the customer site for EACH piece of equipment installed there.

Note: CT Manufacturing completes the GE HHS Data Sheets and provides them to the HHS Administrator.

9.2 U.S. Installations Only

9.2.1 FDA 2579 Form

The Field Engineer should:

- 1.) Download the FDA 2579 form from the HHS Support Central Web site:
http://supportcentral.ge.com/products/sup_products.asp?prod_id=16442
- 2.) Complete the form.
- 3.) E-mail the completed form to the HHS Administrator.

Note: Do NOT print this form after completion. The HHS Administrator will e-mail a printable version to the FE for customer site records.

Note: **Some states require a State Registration Number to complete this form. For any questions concerning your state, contact the HHS Administrator or check the HHS Support Central Website.**

Some states may also require additional information and test information. For instructions, contact the Project Manager of Installation.

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Chapter 6

Electrical Integration and Safety Verifications

Section 1.0 Computer Integration and Configuration

1.1 Introduction and Flowchart

This section describes the reconfiguration, system state restore, options installation, and monitor adjustment procedures.

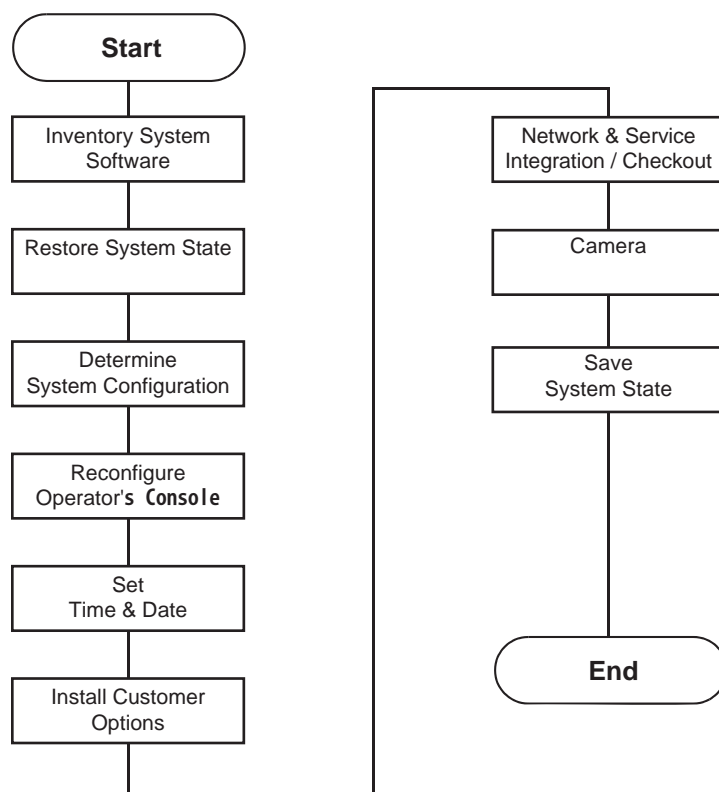


Figure 6-1 Computer Integration and Configuration Process Overview

1.2 Inventory System Software and Restore System State

Locate the box with the system software and option DVD disks, system order sheets, product locator cards, and system reconfig DVD.

You should find the following software CD documents:

- System Operating Software CD set
- Learning and Reference Guide
- Tip Simulator
- Advanced Applications
- Service Information

Note: There may be other items in addition to those above.

1.2.1 Restore System State

1.2.1.1 Time & Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|-----------|--------------|
| 1 (FE or mechanical supplier) | | | |

1.2.1.2 Tools and Test Equipment

None required.

1.2.1.3 Preparation

Your system should have a system state DVD, located in the software box.

The system state DVD contains:

- Characterization
- Calibrations
- Gen Cal
- Other Data

If you cannot locate the shipped system state DVD and your console data is not present, you must do a **complete recalibration** of your system. If the system data is present and your Save State disk is missing, complete a Save State now.

1.2.1.4 Procedures

The installation process uses all the system state files. At this time, use the system state DVD to restore all files.

- 1.) If you are not on the Service Desktop, click the **SERVICE DESKTOP** icon.
- 2.) Click the **UTILITIES** icon.
- 3.) Select **SYSTEM STATE**.
- 4.) Insert the DVD into the DVD drive.
- 5.) Select **CHARACTERIZATION AND CAL**.
- 6.) Select **CALS**.

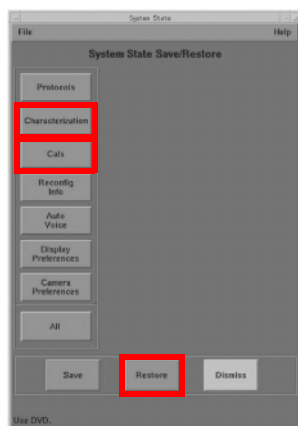


Figure 6-2 System State Restore

- 7.) Select **RESTORE** to restore the system characterization and phantom calibration files to the system.

Restore State can take as long as ten minutes, although typical times average about three minutes. When Restore State completes, dismiss the tool, and proceed to the next section.

If any error should occur during the restore process, see the Software Load Procedure manual (Load From Cold) for information regarding possible error messages and their recovery.

- 8.) Click **NO** for the Reset Scan Hardware popup message.
- 9.) Click **DISMISS**.

1.3 Determine System Configuration

1.3.1 Preparation

For convenient removal and use during installation, System Configuration Data Sheets are located in [System Configuration Data Sheets on page 283](#).

Below is a summary of key information, some of which is required from the customer, to complete system configuration. When gathering this information, refer to [Configure Site Specific Set Up on page 221](#).

System File Information:

- Hospital name (Ask the customer for ALL related fields.) _____
- Service ID _____

Patient Info:

- Next MOD# _____
- Exam #, Diagnostic # 50000 default _____
- Click **YES** to regenerate database.
- Click **NO** for Mobile System.
- HIPAA _____

Preference File Information:

- Doctor's title _____
- Date Format _____
- Time Format _____
- Language type _____
- Selected Fast Cal KV's . default - ALL unless instructed otherwise _____
- Dose Information . default - Unless instructed otherwise _____
- Dicom . default - Unless instructed otherwise _____

Hardware File Information:

- Select table type GT 1700V or Lite Table _____
- Default for all others
- Network printer . default _____

Network file Information:

- Suite Name . (from FE or hospital) _____
 - Host Name . (from FE or hospital) _____
 - IP Address _____
 - Net Mask _____
 - Broadcast Address _____
 - Default Gateway _____
 - Advanced options . default - Unless instructed otherwise by the FE _____
-

1.4 Configure Site Specific Set Up

Note: The document collector box that arrived with your system contains the *Software Installation Procedures* manual, which documents the reconfiguration procedure in more detail.

1.4.1 Preparation

On the following screens, you should make the changes necessary, pressing the corresponding button at the top of the screen to move from screen to screen. When you are done, you can either press the **ACCEPT** button to start the reconfiguration process, or press the QUIT button to exit without changing the system configuration.

While the reconfiguration is going on, messages are displayed in a shell window that closes when reconfiguration is complete. Should you later want to review the reconfiguration output, it is logged in:

```
/var/adm/install.log.YYYYMMDDWWHHMMSS
```

Where

YYYYMMDDWWHHMMSS is the Date/Time that the reconfiguration was started.

To view the file, type: `more /var/adm/install.log.YYYYMMDDWWHHMMSS`

It is possible to abort the reconfiguration while entering information on the reconfiguration screens. Press the **QUIT** button at the top of the screen. There is NO safe way to abort the reconfiguration after pressing the **ACCEPT** button. If the entries made in the screens were incorrect, DO NOT try to stop the reconfiguration, instead wait for it to complete, and rerun reconfig, entering the correct parameters.

1.4.2 Procedure

- 1.) Shut down applications from the Service Desktop.
- 2.) In an xterm window, log in as root:
 - a.) Type: `su -` ENTER
 - b.) Type the root password; press ENTER
- 3.) Launch the Install utility:
Type: `reconfig` ENTER at the prompt.
The OC displays the Install Utility Window as shown in [Figure 6-3](#).

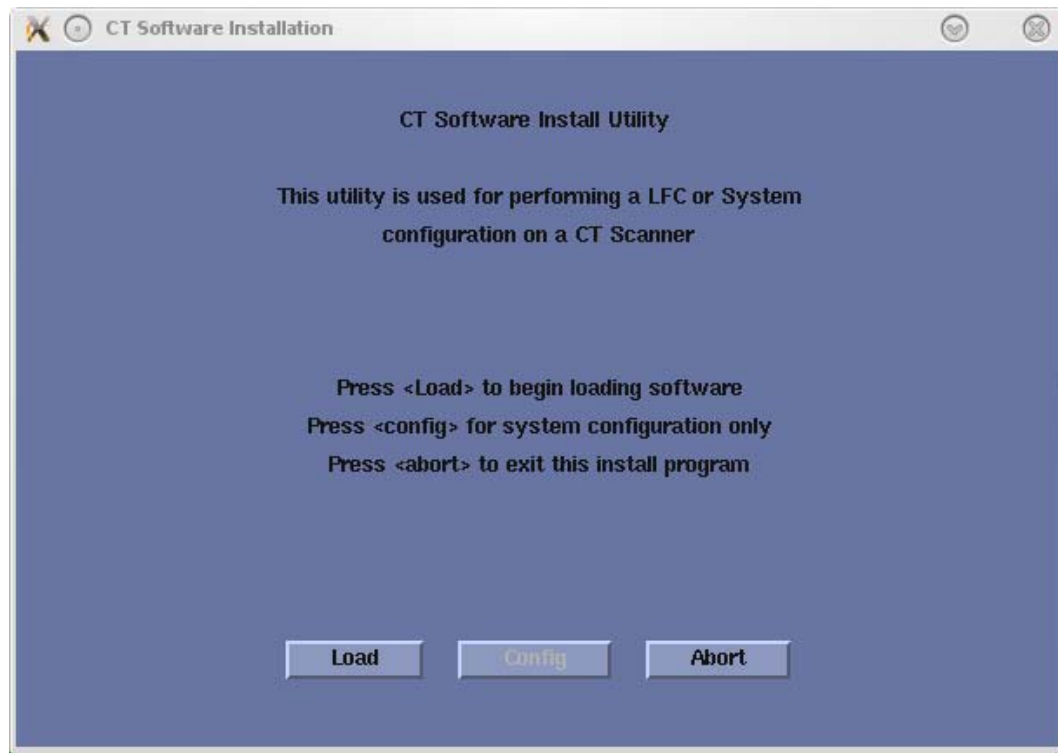


Figure 6-3 Install Utility Window

Comment: The following pages show the screens that are used to change the configuration of the system. These screens are the same as those used for the Software Configuration during Load From Cold. The actual screens will vary depending on the current configuration of your system.

4.) Click the **CONFIG** button.

The OC displays the System Configuration - System Settings Screen as shown in [Figure 6-4](#)



Figure 6-4 System Setting Screen

| ID | Item | Description |
|----|------------------------|---|
| a | Hospital Name | Configures the name that appears on images produced by this scanner. <i>Example: St Marys Hospital</i> |
| b | Service ID | Issued by the service organization. <i>Example: 262785CT2 (no spaces)</i> |
| c | Time Zone | Selects the time zone for this site. |
| d | Next Patient Exam # | Configures the next exam number the scan user interface uses. |
| e | Next Diagnostic Exam # | Customer-selected; configures the next exam number the scan user interface uses. |
| f | Mobile System | Indicates to the software if this CT is in a mobile environment or not. |

Table 6-1 System Setting Screen

| ID | Item | Description |
|----|--------------------------|---|
| g | Recreate Scan Disk Array | Determines whether the Scan Array is recreated during reconfiguration. Used only after multiple Hard Disk Drive replacement |
| h | Energy Saving | Indicates to the software if this CT is in Energy Saving mode or not. |

Table 6-1 System Setting Screen

5.) Configure System Settings:

- a.) Enter the Hospital Name.
- b.) Enter the Service ID.
- c.) Select the Time Zone for this site.

Use the scrollbar at the bottom of the time-zone selection list to view the entire description of a time-zone, to ensure that you are selecting the correct time-zone for your location.

If the time-zone of your location is not in the list, select one of the universal times in the selection menu. In this case, automatic changes for daylight savings time do not take effect. See the LFC manual for more information regarding time-zone setting and selection

- d.) At Next Patient Exam #, ENTER 1 (during installation only; this is customer-selected).
- e.) Next Diagnostic Exam #, ENTER 1 (during installation only; this is customer selected).
- f.) Mobile System, select the correct answer for this installation site.
- g.) Recreate database. Select **YES** if this is an installation with no customer data present.

Important: This destroys any Scan Data present.

- h.) Energy Saving, select the correct answer after confirming with a customer.

6.) Click the **PREFERENCES** button to display the Preference Settings Screen as shown in [Figure 6-5](#).

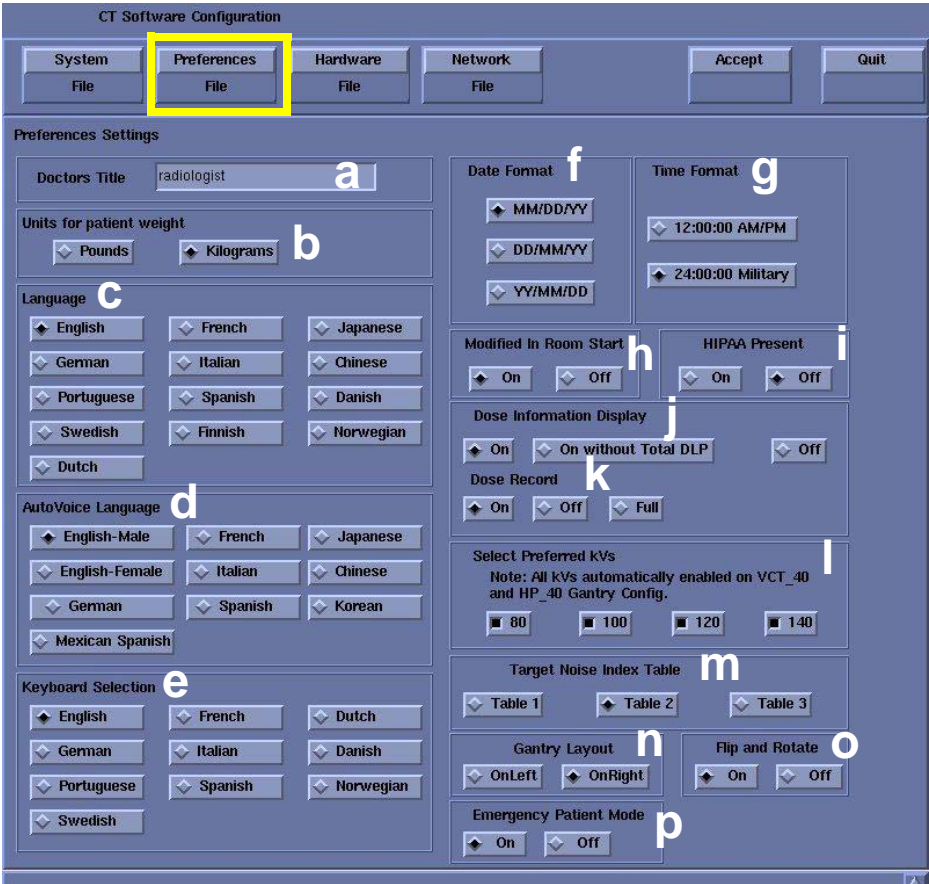


Figure 6-5 Preferences Setup Screen

| ID | Item | Description |
|----|--------------------------|---|
| a | Doctor’s Title | Title of the doctor (e.g. radiologist) |
| b | Units for Patient Weight | Identifies to the software if this site uses pounds or kilograms. |
| c | Language | Selects the language to display on the Application screens. |
| d | Autovoice Language | Configures the language heard in the scan room. |
| e | Keyboard Selection | Configures the language specific keyboard character set. |
| f | Date Format | Configures the format in which the date will be displayed on the images. |
| g | Time Format | Configures the format in which the time will be displayed on the images. |
| h | Modified in Room Start | Be sure OFF is selected, unless the site is in Japan, in which case, this feature should be ON. |
| i | HIPPA Present | Be sure OFF is selected, unless told differently |

Table 6-2 Preferences Settings

| ID | Item | Description |
|----|--------------------------|---|
| j | Dose Information Display | Option for the site to use in monitoring calculated patient dose. Use the default selection unless told differently. Select ON (full CTDiw Display); Select ON WITHOUT TOTAL DLP (no Dose Length Product Display); Select OFF (no CTDiw Display or Dose Report, series 999 created) This setting is available at software version 10HW10.2. |
| k | Dose Record | Configures support for DICOM Dose SR Record option for saving dose information with study. Default is OFF. The dose information is saved in a DICOM structured report. Select ON - Saves the dose information. Select OFF- turn off the option. Select FULL- Save the does information in a DICOM X-RAY Radiation Dose SR SOP Class. |
| l | Preferred Fast Cal kV | Configures the preferred kV that the Fast Cal Routine will calibrate. Defaulted ON for HD systems. |
| m | Target Noise Index Table | Be sure Table 2 is selected. |
| n | Gantry Layout | Configures the preference for Patient loading. Choose correct orientation depending on site specific Gantry layout. Default is ON RIGHT. |
| o | Flip and Rotate | Configures the preference for allowing the Flip and Rotate feature to be turned on in the User Interface on the (Left) SCAN monitor. Default is OFF. |
| p | Emergency Patient mode | Configures the preference for allowing the Emergency Patient to be turned on in the user interface. |

Table 6-2 Preferences Settings

7.) Configure Preferences Settings:

- a.) Enter the Doctors Title.
- b.) Select the Units for Patient Weight for this installation site
- c.) Select the Language for the customer's preference for the Applications screen.**
- d.) Select the Autovoice Language for the customer's preference.**
- e.) Select the Keyboard Selection for the language specific keyboard configuration. **
** To change this setting the Radiology Manager (or equivalent) must signoff on e4879 Installation Form.
- f.) Select the Date Format for the customer's preference.
- g.) Select the Time Format for the customer's preference.
- h.) Make sure OFF is selected for the Modified in Room Start, unless the site is in Japan.
- i.) Select OFF for the HIPAA Present, unless the customer requests differently.
- j.) Select the site preferred Dose Information Display option for the site to use in monitoring calculated Patient Dose. Use the default selection unless told differently.
- k.) Select the site-preferred Dose Record. Configures support for DICOM Dose SR Record option for saving dose information with study. Default is OFF. The dose information is saved in a DICOM structured report. The DICOM standard defines a new DICOM X-RAY Radiation SR SOP class, which the other systems must support. The Dose SR feature saves an exam's dose information in this format.

* ON = Saves the dose information in a DICOM Enhanced SR SOP Class

- * OFF = Turns off the option
- * FULL = Saves the dose information in a DICOM X-Ray Radiation Dose SR SOP Class

Note: This preference shall not be enabled unless specifically requested by the Customer and *Evaluation of Dose SR Compatibility* functional check procedure has been executed and indicates that the other hospital systems support the Dose Report SOP classes!

- l.) Select the Preferred kVs for Fast Cal.
These kVs should include all kVs that the site uses for patient scanning. The default selections are 80, 100, 120, and 140. Use the default selection unless the customer prefers others.
- m.) Verify that Table 2 is selected for Target Noise Index
- n.) Choose the correct orientation for Gantry Layout depending on the orientation of the gantry table as viewed from the operator's console. Default is ON RIGHT.
- o.) Flip and Rotate: Configures the preference for allowing the Flip and Rotate feature to be turned on in the User interface on the (Left) SCAN Monitor. Default is OFF. This preference allows the Customer to apply custom orientation changes based on Exam Type and reconstructions methods on the DICOM images that will be transferred to PACS and related systems.

Note: This preference shall not be enabled unless specifically requested by the Customer and *Evaluation of Image Flip and Rotate Compatibility* functional check procedure has been executed and all DICOM test images pass orientation check!

- p.) Emergency Patient mode, select the correct answer after confirming with a customer.

- 8.) Click the **HARDWARE** button to display the Hardware Settings Screen. See [Figure 6-6](#).

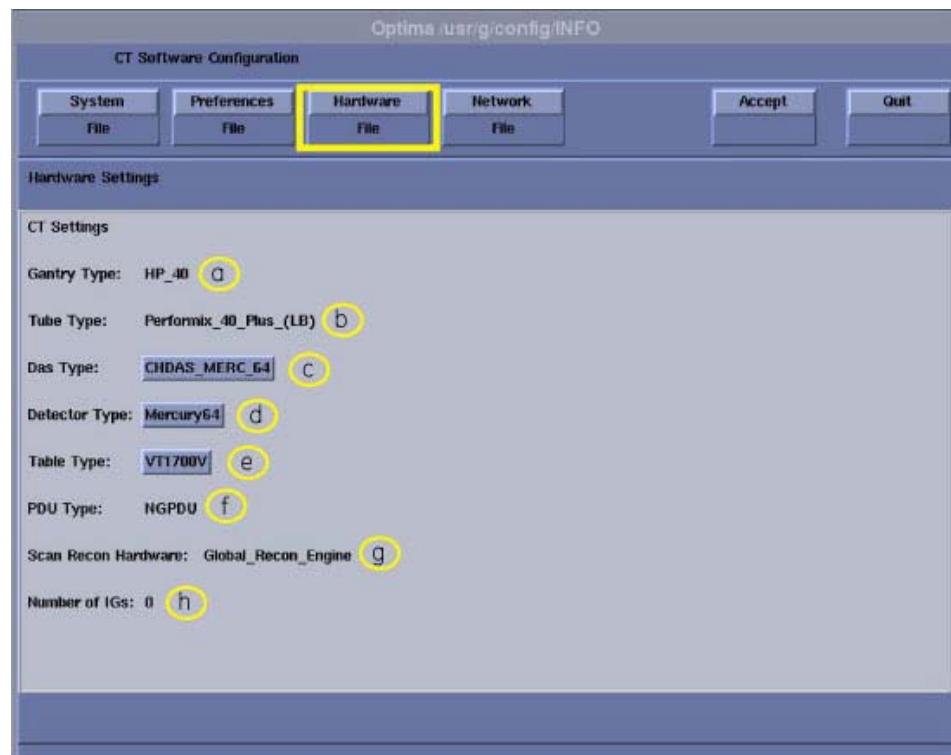


Figure 6-6 Hardware Settings

| ID | Item | Description |
|----|---------------------|--|
| a | Gantry Type | Indicates the type of gantry installed with this system. |
| b | Tube Type | Indicates the type of X-ray tube installed in this system. |
| c | DAS Type | Indicates the type of DAS installed in this system |
| d | Detector Type | Indicates the type of detector installed in this system. |
| e | Table Type | Select the table type: VT1700V Lite Table |
| f | PDU Type | Indicates the type of PDU installed in this system. |
| g | Scan Recon Hardware | Indicates the type of Recon Hardware. |
| h | Number of IGs | Indicates the number of IGs installed in this system. system always indicates 0. |

Table 6-3 Hardware Settings

- 9.) Configure Hardware Settings
 - a.) Review the information for Gantry Type, Tube Type and DAS Type for this system.
 - b.) Select the Table Type installed with this system.
Determine the Table Type using the product locator card shipped with the order information.
 - c.) Review the PDU Type and Scan Recon Hardware Type for this system.
- 10.) Click the NETWORK button to display the Network Settings Screen, as shown in [Figure 6-7](#).

Comment:

This screen provides the ability to declare the CT system on a hospital network. Key information such as Host Name, IP Address, Net Mask (for CT systems on a subnet) must be obtained from the hospital network administrator.

See [Chapter 8](#) for more information and complete details of setting the Hospital/System Network Configuration.

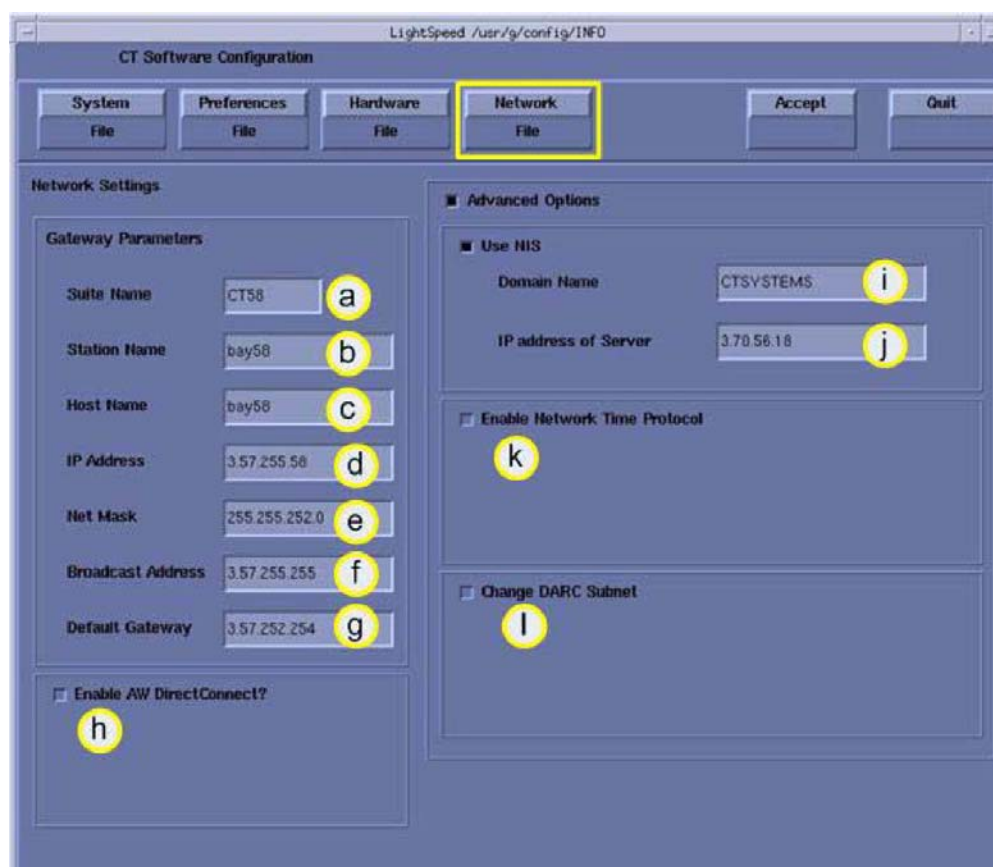


Figure 6-7 Network Settings Screen :

| ID | Item | Description |
|----|------------------------------|---|
| a | Suite Name | The name this site is using on the system to identify the CT suite. |
| b | Station Name | |
| c | Host Name | Identifies the network hostname and AE Title of the CT system to the hospital's network |
| d | IP Address | Hospital's IP Address for the system. |
| e | Net Mask | Hospital-provided; used if the CT system is on a subnet |
| f | Broadcast Address | Same as the IP Address, except the last digit group is set to 1's or 0's, depending on the network configuration. |
| g | Default Gateway | Hospital-provided. |
| h | AW DirectConnect | Enable if the option is provided with the system. |
| i | NIS Domain Name: | Customer-provided site domain name. |
| j | IP Address | The IP Address for the NIS Server, if used. Hospital-provided. |
| k | Enable Network Time Protocol | Hospital decision. |
| l | Change DARC Subnet | Hospital decision. |

Table 6-4 Configure Network Settings

11.) Configure Network Settings:

a.) Enter the Suite Name.

The Suite Name must start with a letter, followed by three alphanumeric characters (a total of four characters). The name of the OC interface is <Suite Name>_OC, within the scanner's subnet. *Example: su01 or ct01* (su and ct must be lowercase)

b.) Enter the Station Name.

* It cannot exceed 16 characters

* It can only contain **a** through **z**, and **0** through **9**.

Example: stmary or ct01

c.) Enter the Host Name.

* It cannot exceed 16 characters

* It can only contain **a** through **z**, and **0** through **9**.

Example: stmary or ct01

d.) Enter the IP Address.

e.) Enter the Net Mask, if the CT system is on a subnet.

f.) Enter the Broadcast Address

g.) Enter the Default Gateway IP Address.

h.) Enable the AW DirectConnect, if this option is provided with this system.

i.) Enter the hospital-provided NIS Domain Name for the system, if NIS is utilized on-site.

j.) Enter the hospital-provided IP Address for NIS Service for the system, if NIS is utilized on-site.

k.) Check the Enable Network Time Protocol box, if instructed to do so by the hospital.

l.) Check the Change DARC Subnet box, if instructed to do so by the hospital.

12.) Review all screens to be sure the information is correct before proceeding to the next step.

13.) Click the **ACCEPT** button.



Figure 6-8 Accept Button

14.) When the configuration changes are complete, the system displays a prompt to reboot. Click on **YES**. (See [Figure 6-9](#))



Figure 6-9 Reboot Screen

15.) The system automatically logs in as ctuser after the reboot. Select OK on the Autostart Disabled popup message.

16.) Open a Shell window.

1.5 Set Time and Date

Important: You must set the time and date on the Host Computer with Application Software down.

- 1.) Open a Unix Shell and log in as root:
 - a.) Type: `su -` **ENTER**
 - b.) Type the root password and press **ENTER**
- 2.) Set the date and time for your time zone by updating the fields in the `setdate` routine.
 - a.) Type the following: `{root@hostname}# setdate`

Note: Type `q` to quit at any time; press **ENTER** to proceed.

To be accurate, this tool prompts you to enter the *Second*. Watch your clock or PC carefully to enter the proper value, and press **ENTER** at the right second to set the accurate time. Press **ENTER** to proceed.

- b.) Type the current Year (1980-2030).
 - c.) Type the current Month (1-12).
 - d.) Type the current Day (1-30).
 - e.) Type the current Hour (Military time, 0-23).
 - f.) Type the current Minute (0-59).
 - g.) Type the current Second (0-59).
- \Updating the time on the OC and DARC, Please Wait...
Ping darc (172.16.0.2) 56(84) bytes of data.
- 3.) Boot system to application level.

1.6 Install Customer Options

1.6.1 Time & Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|-----------|--------------|
| 1 (FE or mechanical supplier) | | | |

1.6.2 Tools and Test Equipment

Laptop

1.6.3 Standard Options Installation

- 1.) Install Standard Options by following the procedure located on your *Optima Service Methods CD* under the Chapter entitled **Software > Install Software Options**.

Note: Standard options are loaded before additional options.

Note: Some options have dependency to other options. Refer to the table below

| Marketing Name | Option Key Name | Dependency/Comments |
|--------------------------|------------------|---|
| 64SLICE OPTION SW KEY | Patient-64-Slice | needs to be installed before installing the following option(s): • Helical Shuttle |
| Neuro 3D Filter | NeuroFilter | needs to be installed before installing the following option(s). • AutoFilter-and-Transfer |

| Marketing Name | Option Key Name | Dependency/Comments |
|---|--------------------------|---|
| 48kw (75kVA) 62kW (90kVA) 72kW (100kVA) | 75kVA 90kVA 100kVA | If multiple kVA option keys are installed, the last installed option key will become effective. |

1.6.4 Additional Options Installation

- 1.) Install Additional Options by following the procedure located on your *Optima CT680 Service Methods CD* under the Chapter entitled **Software > Install Software Options**.

Note: Some options require that data field(s) be completed. Refer to the inventory sheet for the options with data requirements. Have this information available when completing this section.

- Check the FDO to see what options were ordered.
- Compare FDO options to those on the Options DVD.
- If different, contact your local sales representative.

Note: Some options have dependency to other options. Refer to the table below.

| Marketing Name | Option Key Name | Dependency/Comments |
|------------------|---------------------------------|--|
| Connect Pro | Connect Pro | needs to be installed before installing the following option(s). • ExamSplit |
| Smart Score Pro | SmartScore Pro | needs to be installed before installing the following option(s). • EKG Viewer |
| Volume Viewer | Volume Viewer | VolumeViewer needs to be installed before installing the following option(s). • AdvVesselAnalysis • AutoBone • CardEP • CardIQPlus • CTColonoPro • AVA_Xpress • AutoBone_Xpress • CardIQ_Xpress_Reveal • CT_Colono_Pro3D_EC • CT_Perfusion_4D_Neuro or CT_Perfusion_4D_MultiOrgan |
| Snap Shot Assist | SnapShot Assist | SnapShot Assist requires the following option(s): • Sub-0.4-Second-Scan • Sub-0.4-Second-Scan • EKG Viewer • CardIQSnapShot-Cine |
| Snap Shot Freeze | SnapShotAssist Temporal Enhance | SnapShotAssist Temporal Enhance requires the following option(s): • SnapShot Assist |

- 2.) Select INSTALL. A box may appear while the options are loading. When an option is displayed in the *Installed Options* list on the right side, then installation of that option is complete. Note that some options take a fraction of a second to install, while options like 3D may take a half minute.
- 3.) When all options have been installed, check the permanent options on the right side of the screen against those ordered. Make changes as required and close this screen.

- 4.) Run Verify Options to confirm that all options are loaded.
- 5.) After the options are installed, select QUIT then QUIT again.
- 6.) Remove the DVD and write-protect the side with options.
- 7.) When the system prompts to reboot, click YES, and reboot the system to complete the installation.

1.7 Network and Service Integration and Checkout

- If additional network connections are needed for this installation, complete as required. Confirm network operation.
- If additional service integration is required to complete this installation, complete as required.
- Verify that the system information on the service home page is correct and that system service information is present on the service desktop.

1.8 Camera

1.8.1 Time & Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|-----------|--------------|
| 1 (FE or mechanical supplier) | | | |

1.8.2 Tools and Test Equipment

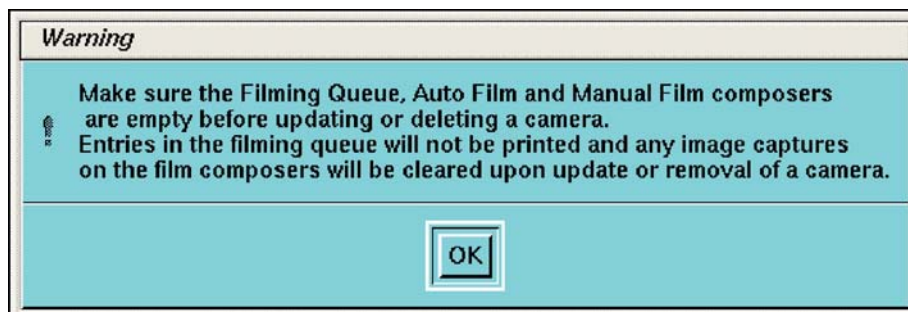
- Data collected from data sheets (See [System Configuration Data Sheets on page 283.](#))
- Software Load Procedures manual
- System Service manual.

1.8.3 Preparation

If a DASM is required, notify the PMU that the DASM is not supported on systems with GOC6.
For details on camera configuration, refer to the Software Load Procedures manual.
For details on troubleshooting the camera, refer to the System Service manual.

1.8.4 Procedures

- 1.) Click on the SERVICE DESKTOP icon.
- 2.) Select CONFIGURATION icon.
- 3.) Select INSTALL CAMERA.
- 4.) Read WARNING message, and click OK.



- 5.) From the remote printer list select a camera, and select ADD for new install.
 - a.) ADD
 - b.) UPDATE
 - c.) DELETE
- 6.) Select DICOM or POSTSCRIPT*.
 - * Follow the manufacturers suggested setup instructions.
- 7.) Follow the procedures on the screen.

Note: Camera and film information is required. Review this information with the customer. Data sheets are available in Service Information CD under Alignment, Setup and Calibrations.

- 8.) Return to the Home Page
- 9.) Click the SERVICE DESKTOP icon.
- 10.) Click SHUTDOWN
- 11.) Click REBOOT.
- 12.) Restart the system.

ENABLE THE CONSOLE LAPTOP PORT

- 13.) On the console in a unix shell, change user to root and enable the console laptop port:
 - a.) Type: su - ENTER
 - b.) Type the root password; press ENTER
 - c.) Type: enableFEport ENTER

1.9 Save System State and Start Up Applications

- 1.) Insert a new Save State DVD into the SCSI Tower DVD RAM drive.
- 2.) Click the SERVICE DESKTOP icon.
- 3.) If reloading software, click UTILITIES.

4.) Select SYSTEM STATE.



Figure 6-10 System State Save

- 5.) Click ALL to select all the calcs, characterizations, etc.
- 6.) Click SAVE.
- 7.) If the following message appears, insert a DVD into the DVD drive and then click YES.

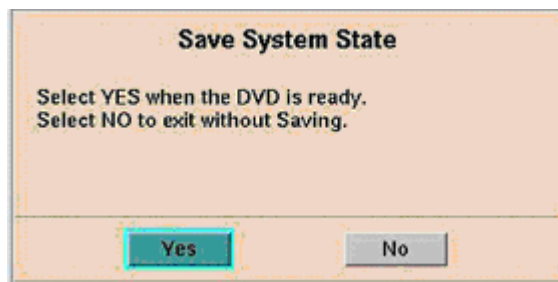


Figure 6-11 Save System State Prompt

- 8.) When completed, click DISMISS.
- 9.) Label and date the disk including the suite name.
- 10.) Close the Service Desktop window at the upper left corner of the screen.

Section 2.0 Table Gantry Integration

2.1 Introduction

Use these procedures to functionally check every part of the table/gantry subsystem.

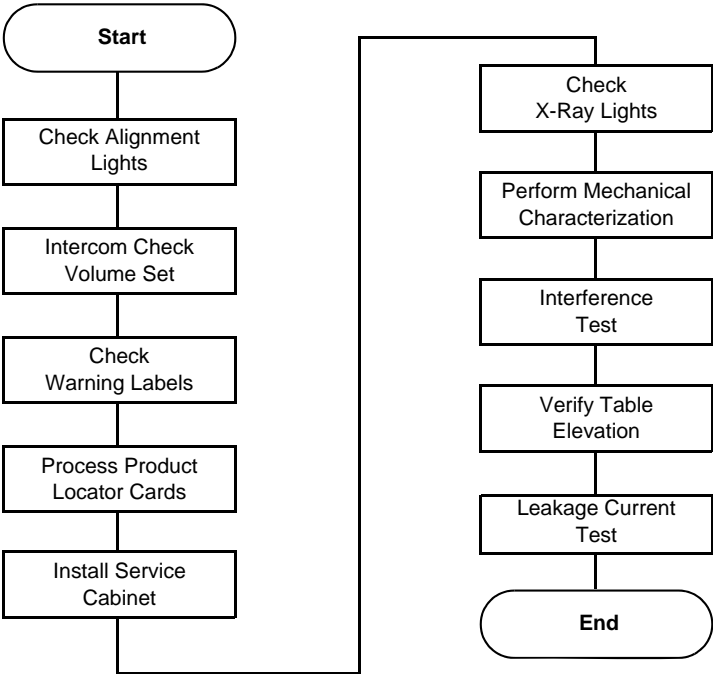


Figure 6-12 Table Gantry Integration Process Overview

- Required Tool
- Multimeter

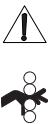
2.2 Check Alignment Lights

2.2.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|---------------|--------------|
| 1 (FE or mechanical supplier) | | labor on-site | |

2.2.2 Tools and Test Equipment

2.2.3 Procedures



CAUTION Verify all personnel have cleared the system. The Gantry rotates during this check.

- 1.) Adjust the scan room lights to normal customer operating levels.
- 2.) Turn ON the AXIAL DRIVE ENABLE and HVDC ENABLE switches (located on the service switch panel).

- 3.) Turn on the alignment light switch on the gantry service panel. The gantry will rotate and the alignment lights will turn ON.



CAUTION

LASER EYE INJURY!

NEVER STARE DIRECTLY INTO THE LASER BEAMS WHEN YOU OPERATE THE ALIGNMENT LIGHTS. STARING INTO THE BEAMS CAN CAUSE PERMANENT EYE DAMAGE.

- 4.) Place a sheet of plain white paper over the output port of each light.
- 5.) Verify that the two laser lines coincide and appear as a single line.

Note: GE designed the internal axial lasers on the current CT system to shine *down* on the collimator. Do NOT adjust the internal alignment lights at this time. The tomographic plane tests use the QA phantom to check the internal axial lasers alignment to the collimator.

- Note:
- 6.) Ensure that cradle is level.
 - 7.) Raise the table to its highest elevation.
 - 8.) Extend the cradle until you see both the internal and external laser lights shining on the cradle.
 - 9.) Place a metric rule on the right edge of the cradle, and measure the distance from the internal axial laser line to the external axial line. Verify this distance equals 240.0 mm \pm 1.0 mm.
 - 10.) Place the rule on the left edge of the cradle, and measure again.
 - 11.) Leave the cradle in its current position, and lower the table to the minimum elevation.
 - 12.) Measure the distance between the internal and external lights on both edges of the cradle, as above. Verify the distance remains equal to 240.0 mm \pm 1.0 mm.
 - 13.) Press the alignment light button on the gantry control panel to turn the lights OFF.

2.2.4 Alignment Light Characterization

- 1.) Start the Mechanical Characterization tool from the Calibration tab on the Common Service Desktop.
- 2.) Select the CHARACTERIZE ALIGNMENT LIGHTS button from the interface.
- 3.) Follow the on-screen instructions.

2.3 Autovoice/GSCB Checks

2.3.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------|------------------|---------------|--------------|
| 2 people required | | labor on-site | |

2.3.2 Tools and Test Equipment

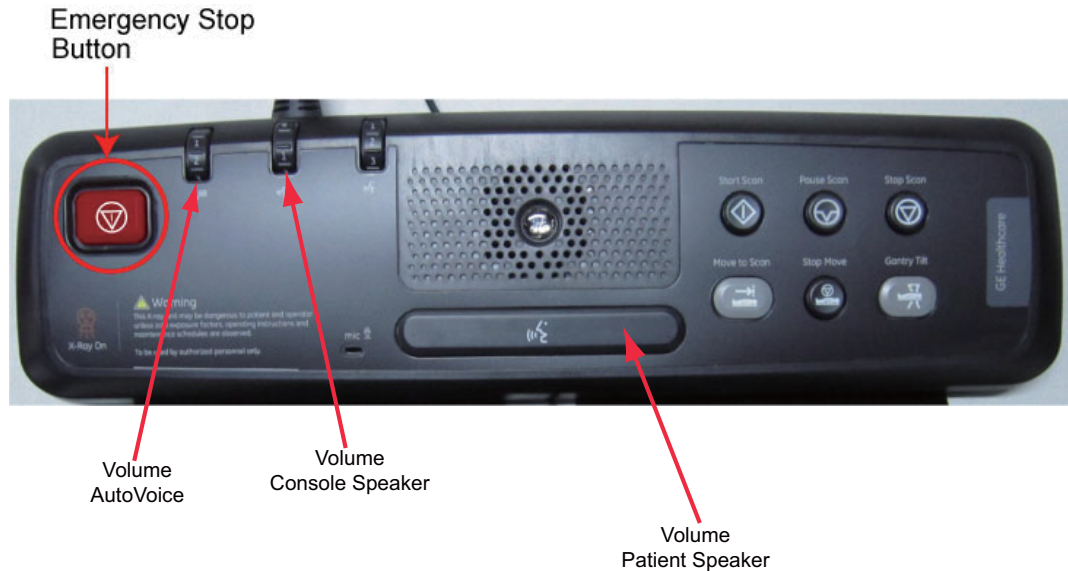


Figure 6-13 GSCB Volume Controls

2.3.3 Procedures

PATIENT SPEAKER

To adjust the volume of the patient speaker in the table:

- 1.) Adjust the left-most volume thumb wheel on the GSCB while speaking into the console microphone. (Press the bar on the GSCB to talk; release the bar to listen.)
- 2.) The patient should be able to clearly hear the operator.

OPERATOR CONSOLE SPEAKER

To adjust the console speaker volume:

- 1.) Have an assistant speak into the gantry microphone.
- 2.) Adjust the GSCB console volume knob until you can clearly hear the assistant.

AUTOVOICE VOLUME

- 1.) On the Scan Desktop, select PROTOCOL MANAGEMENT.
- 2.) Select AUTO VOICE RECORD.
- 3.) Click the 3.4 button, to the right of "FF2. Inspiration".
- 4.) Click the PLAY button, to play the Inspiration AutoVoice message.

- 5.) Adjust the center volume thumb wheel while Autovoice is playing, to set the volume for the gantry speaker.
- 6.) Repeat steps 4 and 5 as necessary to achieve satisfactory volume.
- 7.) Select DONE, then select QUIT.

Note: If a satisfactory volume can not be achieved, refer to the system service manual and review the intercom module setup procedure.

2.4 CT System X-Ray ON Indicators, Cautions & Warning Labels

2.4.1 Check And Install System Warning Labels

All labels are installed in English and present on PDU, Console, Table, Gantry and Accessories. Add the labels listed below (Table 6-5 and Section 2.5) for the appropriate language for the country in which this system is installed. Additionally, apply any other warning labels if present, on equipment where appropriate.

Important: Do not cover English labels already on the system.

| Subsystem | Subsystem | Label(s) |
|-----------------------|---------------------|--|
| Console | GSCB | Language overlay label X-ray warning label |
| | Keyboard | Keyboard warning label Function key overlay label Back warning label |
| | | |
| Gantry | Scan Window | Laser warning label |
| | Laser Window | Laser warning label |
| | Front Cover | Laser warning label Information labels |
| | System GIB | System Global Installation Base (rating) label |
| Table (GT1700V) | Front Side Cover | Pinch Hazard warning label - each side of cover |
| | Back Cradle Pan | Pinch Hazard warning label - each side of cover |
| Table (Lite Table) | Top Side Cover | Pinch hazard warning label - each side of cover |
| NGPDU | Front Cover | Emergency OFF label Gantry Enable label Power ON label |
| | | |
| Accessories | Table Foot Extender | Warning label |
| | Coronal Head Holder | Warning label |
| | Accessory Tray | Warning label |
| | IV Pole | Caution label |

Table 6-5 System Warning Labels

2.4.2 Documentation - Verification

When finished update GE Form e4879 and the installation completion form that all appropriate language labels were installed and present.

2.5 Check Warning Labels

The labels on the system and the system manuals must comply with the country law. Compliance to the law must be completed prior to releasing the system to the customer.

Important: Do not cover English labels already on the system.

2.5.1 On GSCB

- 1.) Make sure the X-Ray warning label appears in the correct location on the GSCB.
- 2.) Record this information on GE Form e4879 located on the Service CD.

2.5.2 On Gantry

- 1.) Check that all laser warning labels are present on the gantry near the laser opening.
- 2.) There should also be warning labels on the lower right side of the gantry front cover.
- 3.) Record this information on GE Form e4879 located on the Service CD.

2.5.3 On Laser

- 1.) Make sure all laser warning labels appear in the correct location on the outside of the gantry.
- 2.) Obtain and install replacements for any missing labels.



Figure 6-14 Laser Warnings and Precautions

2.6 Process Product Locator Cards

- 1.) Collect the product locator cards shipped with the system. There should be approximately 28 product locator cards with the average system.
- 2.) Update the online product locator web site with the required hospital information.
- 3.) Confirm that the serial numbers on the cards shipped with the system match those found on the web site for that GON number. Update the information, as required.
- 4.) Place the cards in a plastic bag, then place them in the service cabinet.

2.7 Install Service Cabinet (Optional)

The service cabinet is shipped assembled.

2.7.1 Time and Personnel

| Required Persons | Preliminary Reqs | Procedure | Finalization |
|-------------------------------|------------------|--------------------------|--------------|
| 1 (FE or mechanical supplier) | | 1. 5 hours labor on-site | |

2.7.2 Tools and Test Equipment

•

2.7.3 Procedures

- 1.) Place the cabinet in the location shown on the site print.
- 2.) Verify and place all of the service materials shipped with the system in the service cabinet.

2.8 Check X-Ray Lights

Perform several scans following the steps below. Verify that the X-ray ON lights are ON during the scans. When done, complete the information on GE form e4869 on the Service CD

- 1.) Make sure the axial drive enable and HVDC enable switches are ON.
- 2.) If you are not on the Service Desktop, click on the Service Desktop icon.
- 3.) Select DIAGNOSTICS.
- 4.) Select DIAGNOSTIC DATA COLLECTION.
- 5.) Set the scan time to 2.00.
- 6.) Set the kV to 80.
- 7.) Set the mA to 40.
- 8.) Press ACCEPT RX.
- 9.) Press START SCAN button when flashing.
- 10.) Record the above information on GE Form e4879 located on the Service CD.

2.9 Table Height Characterization

The relationship of table height to ISO center and internal-to-external landmarks must be characterized for proper interference matrix functionality.

Important: Do NOT perform tilt characterization.

- 1.) Select the CHARACTERIZE TABLE HEIGHT button from the interface.
- 2.) Follow the on-screen instructions.

Note: If the table height is less than 21mm or greater than 25mm, relative to ISO, you must adjust the table height using the table leveling pad and adjusters. Raise or lower all four adjusters equally to achieve desired results. Refer to [Drill the Anchor Holes on page 69](#), Book 1 Installation Manual.

2.10 Short Footprint Setting (VT1700V and Lite Table)

Normally, the table cradle can travel up to 1712mm (67.4 in.) for VT1700V or 1537mm (60.5 in.) for Lite table from scan central line. The Short Footprint function can limit this distance to a value shorter than maximum cradle extension (in 1mm (0.04 in.) increments).

Note: If you moved the cradle into the set maximum distance while the table is not at the highest position, then the system will inhibit the table upward operation.

Note: During the table characterization procedure, or while operating the cradle with the service switches on the GTCB board, the cradle is enabled to move up to full extension, regardless of the short footprint set distance.



CAUTION

Potential for injury to a person.

Small space present.

The IN-limit position of Cradle short footprint mode should be set in order not to pinch patient between the cradle edge and scanning room wall.



NOTICE

It is recommended that safety clearance from cradle IN-limit to wall should be no less than 150mm (5.9 in.).

- 1.) Attach the cradle extender on the cradle.
- 2.) Launch the MECHANICAL CHARACTERIZATION tool from the Service Desktop, select CALIBRATION tab.
- 3.) Select SHORT FOOT PRINT.
- 4.) Follow the on-screen instructions.
- 5.) After the setting, verify that you can not move the cradle inward further from the set position, with the following conditions:
 - The table is at the highest position.
 - The table is at a lowest position where scanning is possible.

2.11 Interference Test

PREREQUISITES

- Be sure that the System State was restored from DVD per [Section 1.2.1 on page 218](#).
- Reset the hardware to download the new characterization values before performing the table/gantry interference tests in this section.

CONFIGURATION

- 1.) Be flashed with latest software.
- 2.) Have elevation and cradle and IMS characterized.
- 3.) Be mechanically aligned to gantry.
- 4.) Have had the table-gantry characterization completed.
- 5.) Have the table extender is installed.

☐ Check box when complete.

TEST OUTLINE

The following tests verify the proper tilt and table interference matrix on the gantry.

- [Verify Table Elevation - Section 2.13](#)

- [Position Tilt, Move Table to Interference Limit - Section 2.13.1](#)
- [Position Table, Move Tilt to Interference Limit - Section 2.13.2](#)
- [Tilt Limits When Table Below Scan Plane Lower Limit - Section 2.13.3](#)

REQUIREMENTS

The following requirements are tested in this series of tests:

- 1.) No motion shall cause the table to hit the gantry (or gantry to hit the table)
- 2.) Requirement #1 shall include the use of the table extender.
- 3.) No tilt motion shall cause the gantry tilting frame to touch the stationary base covers for any tilt angle.

LIMITATIONS

These requirements will only be met when the table is NOT in service mode.

INTERPRETING TEST RESULTS

If test results indicate that elevation and/or tilt display readings fail to meet specifications, DO NOT adjust the limit switches. Instead, re-characterize and/or adjust tilt speed. Perform elevation and cradle and IMS first, then repeat the test. If it still fails, perform tilt.

2.12 Disconnection of the CT Table Foot Pedal Cables

Tables installed in a Surgical Environment must have their foot pedals permanently disabled. Vertical motion may still be accomplished through the use of the push buttons found on the gantry control panels. To proceed with the disconnection:

- 1.) Inform you Customer prior to disconnection.
- 2.) Escalate the issue through the Customer Satisfaction Opportunity (CSO) tool using the Customer Escalation Issue Process (CEIP).
- 3.) Obtain and follow Engineering Instruction 5328450INS to disconnect the pedals.

2.13 Verify Table Elevation

| Test | Steps | Expected Results |
|------|---|---|
| 1 | Reset the gantry firmware. Wait the firmware starts up. | |
| 2 | Install the Cradle Extender if it is not installed. | |
| 3 | Make notes of "Distance from ISO center" by selecting "View Values" button on Mechanical Characterization in Calibration Menu of CSD. | The value of distance "V" = _____ This value should be used following tests. |
| 4 | Move the cradle (and IMS) to home position. Push the table down gantry push-button to lower the table to the minimum height. | With GT1700V: Elevation Display should read $560.0 + V \pm 3 \text{ mm}$. With Lite Table: Elevation Display should read $550.0 + V \pm 3 \text{ mm}$. |
| 5 | Raise the table to the maximum height using the gantry controls. | Elevation Display should read $V \pm 3 \text{ mm}$. |

Table 6-6 Table Elevation Tests

2.13.1 Position Tilt, Move Table to Interference Limit

The following tests verify the table interference limits at different tilt locations.

- Note:
- "S" means top of gantry tilts away from the table base.
 - "I" means top of gantry tilts toward the table base.

Important: For all tests, make sure there is 2.5 cm of clearance between the gantry and table. Also, for all tilt angles used in this test, make sure that the Gantry Tilting frame covers do not touch the stationary base covers.

| Test | Steps | Expected Results |
|------|--|---|
| 1 | Move cradle (and IMS) to home position and set internal landmark. | Cradle position on display should read 0.0. |
| 2 | With GT1700V / Lite Table: Raise table height to maximum height, set the internal landmark, move cradle into gantry 1m. | With GT1700V / Lite Table: Table elevation on display should read $V \pm 3 \text{ mm}$. Cradle position on display should read 1000.0 mm. |
| 3 | Tilt the gantry to I30.0, then lower table until motion stops. | With GT1700V: Table elevation on display should read $64.5 \pm 3 \text{ mm}$. Tilt display should read I30. With Lite Table: Table elevation on display should read $72.0 \pm 3 \text{ mm}$. Tilt display should read I30. |

Table 6-7 Position Tilt, Move Table to Interference Limit Tests

| Test | Steps | Expected Results |
|------|---|---|
| 4 | Tilt the gantry to I23.0, then lower table until motion stops. | With GT1700V: Table elevation on display should read 134.0 ± 3mm. Tilt display should read I23. With Lite Table: Table elevation on display should read 142.5 ± 3mm. Tilt display should read I23. |
| 5 | Tilt the gantry to I20.0, then lower table until motion stops. | With GT1700V: Table elevation on display should read 156.0 ± 3mm. Tilt display should read I20. With Lite Table: Table elevation on display should read 164.5 ± 3mm. Tilt display should read I20. |
| 6 | Raise the table elevation to maximum height. | Table elevation on display should read V ± 3mm. |
| 7 | Tilt the gantry to S30.0, then lower table until motion stops. | With GT1700V Table: Table elevation on display should read 146.5 ± 3mm. Tilt display should read S30. With Lite Table: Table elevation on display should read 156.0 ± 3mm. Tilt display should read S30. |
| 8 | Tilt the gantry to S23.0, then lower table until motion stops. | With GT1700V Table: Table elevation on display should read 174.5 ± 3mm. Tilt display should read S23. With Lite Table: Table elevation on display should read 182.0 ± 3mm. Tilt display should read S23. |
| 9 | Tilt the gantry to S20.0, then lower table until motion stops. | With GT1700V Table: Table elevation on display should read 184.0 ± 3mm. Tilt display should read S20. With Lite Table: Table elevation on display should read 192.0 ± 3mm. Tilt display should read S20. |
| 10 | With GT1700V Table: Raise the table to 146 mm. With Lite Table: Raise the table to 154 mm. | With GT1700V Table: Table elevation on display should read 146mm. With Lite Table: Table elevation on display should read 154mm. |

Table 6-7 Position Tilt, Move Table to Interference Limit Tests (Continued)

| Test | Steps | Expected Results |
|------|---|---|
| 11 | With GT1700V Table: Tilt gantry to S30 and verify the table height can be adjusted from 146 to 25mm. | With GT1700V Table: Tilt display should read S30. Table lower limit should be $146 \pm 3\text{mm}$. Upper table limit should be $V \pm 3\text{ mm}$. |
| | With Lite Table: Tilt gantry to S30 and verify the table height can be adjusted from 154 to 25mm. | With Lite Table: Tilt display should read S30. Table lower limit should be $154 \pm 3\text{mm}$. Upper table limit should be $V \pm 3\text{ mm}$. |
| 12 | With GT1700V Table: Set the table height to 62 mm. | With GT1700V Table: Table elevation on display should read 62 mm. |
| | With Lite Table: Set the table height to 70 mm. | With Lite Table: Table elevation on display should read 70 mm. |
| 13 | Tilt gantry to I30. | Tilt display should read I30. |

Table 6-7 Position Tilt, Move Table to Interference Limit Tests (Continued)

2.13.2 Position Table, Move Tilt to Interference Limit

The following tests verify the tilt interference limits at different table heights.

- Note:
- “I” means top of gantry tilts toward the table base
 - “S” means top of gantry tilts away from the table base.

Important: For all tests, make sure there is 2.5 cm of clearance between the gantry and table.

| Test | Steps | Expected Results |
|------|--|--|
| 1 | Move cradle (and IMS) to home position and set internal landmark. Set gantry tilt to zero. | Cradle position on display should read 0.0. Gantry tilt on display should read 0.0. |
| 2 | With GT1700V / Lite Table: Raise table height to maximum height, set the internal landmark, move cradle into gantry 1m. | With GT1700V / Lite Table: Table elevation on display should read $V \pm 3\text{mm}$. Cradle position on display should read 1000.0 mm. |
| 3 | Lower table until height is 115mm. Tilt the gantry top away from the table ("S") until it stops. | Table elevation on display should read 115mm. Tilt display should read $S30 \pm 0.5^\circ$. |
| 4 | Tilt the gantry top toward the table ("I") until it stops. | With GT1700V Table Table elevation on display should read 115 mm. Tilt display should read $I25.0 \pm 0.5^\circ$. With Lite Table: Table elevation on display should read 115 mm. Tilt display should read $I26.0 \pm 0.5^\circ$. |

Table 6-8 Position Table, Move Tilt to Interference Limit Tests

| Test | Steps | Expected Results |
|------|---|--|
| 5 | Tilt the gantry to 0. Lower table until height is 200 mm. Tilt the gantry top away from the table ("S") until it stops. | <p>With GT1700V Table: Table elevation on display should read 200 mm. Tilt display should read $S14.5 \pm 0.5^\circ$.</p> <p>With Lite Table: Table elevation on display should read 200 mm. Tilt display should read $S17.0 \pm 0.5^\circ$.</p> |
| 6 | Tilt the gantry top toward the table ("I") until it stops. | <p>With GT1700V Table: Table elevation on display should read 200 mm. Tilt display should read $I11.0 \pm 0.5^\circ$.</p> <p>With Lite Table: Table elevation on display should read 200 mm. Tilt display should read $I13.0 \pm 0.5^\circ$.</p> |
| 7 | Tilt the gantry to 0. Lower table until height is 210 mm. Tilt the gantry top away from the table ("S") until it stops. | <p>With GT1700V Table: Table elevation on display should read 210 mm. Tilt display should read $S10.5 \pm 0.5^\circ$.</p> <p>With Lite Table: Table elevation on display should read 210 mm. Tilt display should read $S13.5 \pm 0.5^\circ$.</p> |
| 8 | Tilt the gantry top toward the table ("I") until it stops. | <p>With GT1700V Table: Table elevation on display should read 210 mm. Tilt display should read $I8.5 \pm 0.5^\circ$.</p> <p>With Lite Table: Table elevation on display should read 210 mm. Tilt display should read $I10.5 \pm 0.5^\circ$.</p> |

Table 6-8 Position Table, Move Tilt to Interference Limit Tests

2.13.3 Tilt Limits When Table Below Scan Plane Lower Limit

The following tests verify the table and tilt interference limits when the table height is below the scan plane.

- Note:
- “I” means top of gantry tilts toward the table base
 - “S” means top of gantry tilts away from the table base.

Important: For all tests, make sure there is 2.5 cm of clearance between the gantry and table.

| | Steps | Expected Results |
|---|--|--|
| 1 | Set gantry tilt to zero. Move cradle (and IMS) to home position, lower the table all the way, and set the internal landmark. | With GT1700V Table: Cradle position on display should read 0.0. Gantry tilt on display should read 0.0. Table height should read 560.0 +V ± 3 mm. With Lite Table: Cradle position on display should read 0.0. Gantry tilt on display should read 0.0. Table height should read 550.0 +V ± 3 mm. |
| | Tilt the gantry forward and backwards and verify the following tilt limits: With GT1700V: 0.0 and I30.0 With Lite Table: S4.5 and I30.0 | With GT1700V: Gantry tilt on display should read 0.0 ± 0.5°. Gantry tilt on display should read I30.0 ± 0.5°. With Lite Table: Gantry tilt on display should read S4.5 ± 0.5°. Gantry tilt on display should read I30.0 ± 0.5°. |
| | Set Gantry tilt to 0. Then, using the gantry push-buttons, move the cradle in towards the gantry until it is stopped. | With GT1700V: Gantry tilt on display should read 0.0. Cradle should stop at 3.0 mm ± 6 mm from the home position. With Lite Table: Gantry tilt on display should read 0.0. Cradle should stop at 58.0 mm ± 6 mm from the home position. |
| | Set gantry tilt to zero. Move cradle to home position. Raise the table to a height of 386 mm and verify the following tilt limits: With GT1700V: S1.5 and I30.0. With Lite Table: S6.5 and I30.0. | Cradle position on display should read 0.0 Gantry tilt on display should read 0.0. With GT1700V: Table height should read 386 mm. Gantry tilt on display should read S1.5 ± 0.5°. Gantry tilt on display should read I30.0 ± 0.5°. With Lite Table: Table height should read 386 mm. Gantry tilt on display should read S6.5 ± 0.5°. Gantry tilt on display should read I30.0 ± 0.5°. |

Table 6-9 Tilt Limits When Table Below Scan Plane Lower Limit Tests

| Steps | Expected Results |
|---|---|
| Set Gantry tilt to 0. Set the internal landmark. Then, using the gantry push buttons, move the cradle in towards the gantry until it is stopped. | With GT1700V: Gantry tilt on display should read 0.0. Cradle should stop at 19.0 mm \pm 6 mm from the home position. With Lite Table: Gantry tilt on display should read 0.0. Cradle should stop at 75.0 mm \pm 10 mm from the home position. |
| Set gantry tilt to zero. Move cradle (and IMS) to home position. | Cradle position on display should read 0.0. |
| Raise the table to a height of 242 mm and verify the following tilt limits: With GT1700V: S11.5 and I30.0. With Lite Table: S15.0 and I30.0. | With GT1700V: Table height should read 242 mm. Gantry tilt on display should read S11.5 \pm 0.5°. Gantry tilt on display should read I30.0 \pm 0.5°. With Lite Table: Table height should read 242 mm. Gantry tilt on display should read S15.0 \pm 0.5°. Gantry tilt on display should read I30.0 \pm 0.5°. |
| Set Gantry tilt to 0. Raise the table to 210 mm. Then, using the gantry push buttons, move the cradle in towards the gantry until it is stopped. | Gantry tilt on display should read 0.0. Cradle should go all the way through the gantry bore to the full-extended position. |
| Set gantry tilt to zero. Move cradle to home position, lower the table all the way and set the internal landmark. | With GT1700V Table: Cradle position on display should read 0.0. Gantry tilt on display should read 0.0. Table height should read 560.0 +V \pm 3 mm. With Lite Table: Cradle position on display should read 0.0. Gantry tilt on display should read 0.0. Table height should read 550.0 +V \pm 3 mm. |
| Tilt the gantry top toward the table to a tilt of 30 degrees. | Display should read I30. |
| With the table down all the way, move the cradle in until it stops. | With GT1700V: Cradle position should be 340.0 \pm 3 mm. With Lite Table: Cradle position should be 385.0 \pm 10 mm. |
| Move the cradle (and IMS) to the home position, raise the table to a height of 386 mm, set the internal landmark, and then move the cradle in until it stops. | With GT1700V: Cradle position should be 306 \pm 3 mm. With Lite Table: Cradle position should be 363 \pm 10 mm. |

Table 6-9 Tilt Limits When Table Below Scan Plane Lower Limit Tests (Continued)

| | Steps | Expected Results |
|--|---|---|
| | With GT1700V Table: Raise the table to a height of 62 mm, then move the cradle in. With Lite Table: Raise the table to a height of 70 mm, then move the cradle in. | Cradle should go all the way through the gantry bore to the full-extended position. |



Table 6-9 Tilt Limits When Table Below Scan Plane Lower Limit Tests (Continued)

2.14 Leakage Current Test

Follow the instructions listed in [System-Level Safety Tests on page 281](#).


Chapter 7

Image Quality

CAUTION

Shock Hazard.
Voltage Present.
No service on left side while energized.



NOTICE

Potential for Data Loss and/or Equipment Damage

To prevent potential data loss, please do the following:

- Record data collected from procedures in this chapter into Form F4879 when directed, located in [GE and Regulatory Forms on page 214](#) of this book.
- Only use the Installation manual that arrives with your system for installation. Any other revisions of this manual may not exactly match your system.

Section 1.0 Image Quality Process Overview Flowchart

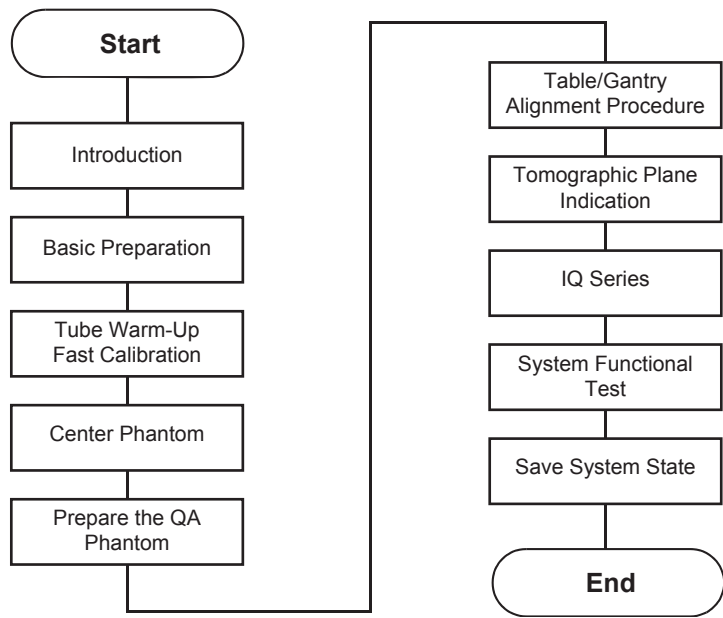


Figure 7-1 Image Quality Process Overview

Section 2.0 Reference Procedure - Scanning w/Service Protocols



NOTICE Do not perform the following procedure until instructed to do so in other sections of this chapter.

This procedure is used to locate the Manufacturing and Installation protocols on the SERVICE tab.

Note: **Manufacturing and Service share this Protocol list. Different product option offerings also use this list. Carefully follow the scan section instructions and verify you acquired the images with the correct technique before filling out the data sheet. Otherwise you may troubleshoot an image problem that only exists because you used the wrong technique.**

PROCEDURE

- 1.) Select the NEW PATIENT icon on the left monitor.
- 2.) Enter a Patient ID (e.g., getest) for easy identification.
- 3.) Click on the box labeled SERVICE to access the necessary protocols.

Section 3.0 Tube Warm Up and Fast Cal

- 1.) Select DAILY PREP and TUBE WARMUP. Follow the steps on screen until all scans are completed.
- 2.) Select FAST CALIBRATION from the Daily Prep menu.

Four basic steps will be performed: Gantry Balance Check, Mylar Window Check (Warm up scans if tube is cold), Interconnectivity Map Scan List, and Fast Cal Air Scans.

Note: **Use the default Fast Cal selections determined by the system configuration. (The system defaults to all four kV stations, but you can choose kV stations to calibrate during reconfig.)**

- 3.) Run the selected air calibrations.
- 4.) When the calibration process completes, click on QUIT.

Section 4.0 Prepare the QA Phantom

Note: **The QA-3 phantom is shipped water-filled.**

- 1.) Locate the multi-language sticker packet in the QA phantom shipping box.
- 2.) Attach the sticker with the customer's language to the face of the phantom hanger bracket.
- 3.) Check for bubbles.
- 4.) Purge and refill if necessary.

Section 5.0 Center Phantom

5.1 Required Tools

- Standard FE Tool Kit
- 9" Level

5.2 Procedure

- 1.) Locate the QA phantom and mount it and the phantom holder on the table.
- 2.) Use the adjustment knobs on the phantom holder to level the phantom front-to-back and side-to-side with a bubble level.
- 3.) Select SCANNER UTILITIES on the left monitor.
- 4.) Select CENTER PHANTOM.
- 5.) Follow the on-screen procedures.

Note: The phantom center spec is $\pm 0.5\text{mm}$.

- 6.) Select QUIT when the phantom is within specification.

Level the phantom both front-to-back and side-to-side. (Use a 6" level.)

Section 6.0 Tomographic Plane Indication

- 1.) Place the QA phantom on the phantom holder.
- 2.) Turn ON the internal alignment lights, and drive the phantom into the gantry opening, until the line on the phantom lines up with the internal laser lights.
- 3.) Verify that BOTH internal axial lasers line up along the line on the QA phantom. If not, check table/gantry, cradle, and/or laser alignment.
- 4.) Center the phantom in the scan plane with the CENTER PHANTOM found in the "Scanner Utilities" on the left monitor in the lower right corner.
- 5.) Click on CONFIRM.
 - a.) Adjust phantom as needed to achieve $\pm 1.0\text{ mm}$ in both X and Y. Use CONFIRM to retry each time.
 - b.) Click DONE and QUIT when centered.
- 6.) Select NEW PATIENT.
- 7.) Select the service protocol, MANUFACTURING, TOMO PLANE INDICATION. The protocol should appear as shown in [Table 7-1](#).

| Scan Type | Start Location | End Location | No. of Images | Thick Speed | Interval (mm) | Gantry Tilt | SFOV | kV | mA | Total Exposure Time | DFOV | Recon Type |
|----------------------------|----------------|--------------|---------------|---------------------------|---------------|-------------|---------------|-----|-----|---------------------|------|------------|
| Helical Full 0.8 sec | I3.000 | S3.200 | 32 | 0.625 10.62 0.531:1 | 0.200 | S0.0 | Small Body | 120 | 100 | 2.1 | 25.0 | Bone |

Table 7-1 Tomographic Plane Protocol

- 8.) Select IMAGE WORKS and select Exam, Series, Image 1.
- 9.) Click on VIEWER.

- 10.) Select **FORMAT** and choose single image format view.
- 11.) Locate the scan plane indicator, the longest bar in the bar pattern on the right side of the phantom. The right side of the phantom corresponds to the side of the image labeled **L** on the display screen. See **Figure 7-2**.

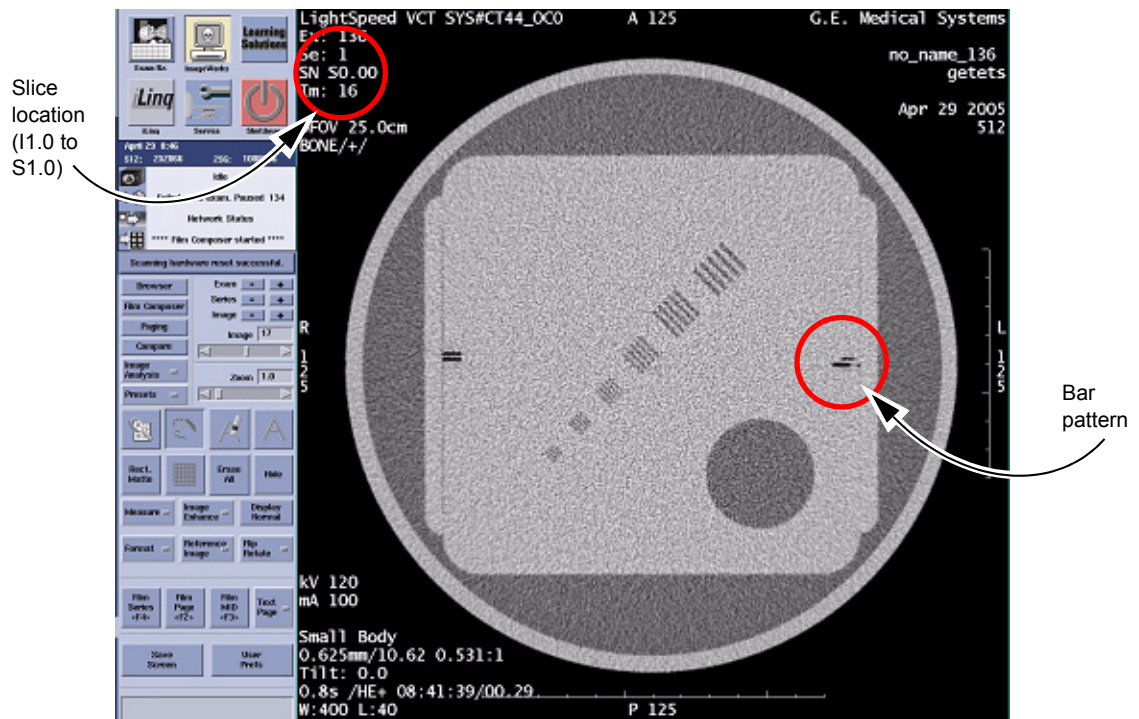


Figure 7-2 Exam, Series, Image 1

- 12.) On the GE Form e4879 Data Sheet, record the scan location (shown on the image annotation) of the image with the darkest scan plane indicator (darkest long bar).
- 13.) If your system meets all the installation and alignment specifications, the image at scan location zero (S0.0) should contain the scan plane indicator. If scan location S1.0 or scan location I1.0 has the darkest bar, the system still meets the specification. The scan plane deviation should equal $S0.0 \pm 1.0\text{mm}$. If necessary, adjust the internal alignment light position to meet the $S0.0 \pm 1.0\text{mm}$ requirement.
- 14.) Repeat the Tomographic Plane Indication test with the external alignment lights.
 - a.) Use the external alignment light, and press the external landmark.
 - b.) Verify the external light lines up along the black line on BOTH the left and right sides of the QA phantom.
 - c.) The scan plane indication must fall within the $S0.0 \pm 1.0\text{mm}$ specification.
- 15.) Initial below.

Section 7.0 Image Quality Test

7.1 Preparation

- All table mechanical alignment procedures are completed.
- The table perpendicular alignment test passed.
- The table tilt alignment test passed.
- Table anchors are in place and within specification.

7.2 Procedures

Important: Run ALL Image Series Tests in Auto Mode.

SETUP

- 1.) Check that the table cradle is level in all directions. Correct, if necessary.
- 2.) Check the scan window for proper installation
- 3.) From the operator's desktop, select SCANNER UTILITY.
- 4.) Complete section 4, CENTER PHANTOM procedure.
- 5.) Locate the white service CD that ships with the system, located in the tech pub tray of the lean cart.
- 6.) Load the CD into the laptop drive. Look under the Functional Checks tab located on the left hand side. Run the QA procedure.
- 7.) Record all pass/fail information on the GE e4879 form.

Section 8.0 System Functional Test

Use the system tests in the following sections to exercise all aspects of the system and to ensure system integrity before releasing to the customer. Although the means, standard deviation, and resolution specifications do not apply during system functional tests, treat any artifact or image anomaly as a failure.

8.1 Preparation

- All table mechanical alignment procedures are completed.
- The IQ test passed.
- All options are installed and operational.

If you encounter a failure during the system tests:

- Record any evidence of artifacts, such as rings, streaks, shading, cupping, noise, or center artifacts.
- Correct artifacts, system test, or image series failures when they occur. Any delay in repairs could increase the number of retests.
- Correct artifacts, system test, or image series failures when they occur.
- Record failure information in the comment section of the GE Form e4879.

8.1.1 What is Tested

- Scanning modes, including Cardiac.
- Installed hardware options, including:
 - UPS operation
 - cardiac monitor
 - remote monitor
 - bar code Reader
 - image transfer (if the network is operational)
 - confirm that customer network features are operational, based on options ordered and the network.
 - modem, if it is installed
 - saving an image to DVD
 - injector functional tests
 - AW functional tests
 - filming/camera functional tests
 - SmartStep

8.2 Procedure

- 1.) Locate the white service CD that ships with the system, located in the tech pub tray of the lean cart.
- 2.) Load the CD into the laptop drive. Look under the Functional Checks tab located on the left hand side. Run the System Scanning Test procedure.
- 3.) Record all pass/fail information on the GE e4879 form.

8.2.1 Confirm the following:

- 1.) The UPS goes into a backup mode when the power fails. Confirm that you can shut down the console and the table is operational before the loss of battery power. Follow the procedure in the UPS startup/shutdown procedure.
- 2.) The remote monitor displays the same images as shown on the console image monitor.
- 3.) The bar code reader is operational and data is displayed.
 - From the APPLICATION screen, select NEW PATIENT.
 - Enter the Patient ID.
 - Using the barcode reader, scan a bar code to verify the information shown here.

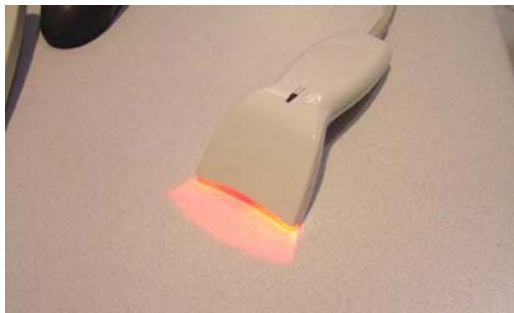


Figure 7-3 Barcode Reader

- 4.) If installed, confirm the following:
 - An image can be filmed, saved to DVD, and networked to another network device or AWW.
 - The Nomoto injector is operational, and all setup and calibration procedures are completed.
 - All other installed injectors must power on.
 - The SmartStep option is operational. Set up a SmartStep scan and confirm that the foot switch and the hand switch operate.

8.3 Cardiac Functional Test

8.3.1 Procedure

CARDIAC MONITOR SETUP

- 1.) Install these cables on the gantry option interface panel
 - IEC (power cord to gantry) cable
 - Cat 5 (cable between monitor and gantry) cable
 - Lemo connector (between monitor and gantry) cable
 - Ground Connection cable
- 2.) Turn on the monitor. Follow the monitor self test setup procedure using the document shipped with the system.
- 3.) From the APPLICATION screen, select NEW PATIENT. Fill out:
 - Patient ID: GE Test
 - Name: Cardiac Functional System Functional Test
 - Select from Protocol Menu
 - * User
 - * Chest
 - On the dark blue bar on the scan monitor select Gating "On"
- 4.) Check for presence of these items:
 - a.) Heart rate on the gantry display board
 - b.) Cardiac pulses shown on the screen
 - c.) Gating BPM displayed on the screen
 - d.) ECG trace highlighted on the screen

8.4 Connect Pro Functional Test

8.4.1 Procedure

PATIENT SCHEDULER

- 1.) On the scan desktop select Patient scheduler
- 2.) Select the button labeled Update
- 3.) The customer list should be present select Export data
- 4.) Send a test image to a workstation AWW or what ever is available.

8.5 Finalization

This section is complete when all of the above items pass.
Check all appropriate boxes on the GE Form e4879.

Section 9.0 Save System State

Use the following commands to create the System State DVD.

- 1.) Insert a DVD into the DVD drive.
- 2.) If you are not on the Service Desktop, click the SERVICE DESKTOP icon,.
- 3.) Click on UTILITIES icon.
- 4.) Select SYSTEM STATE to open the System State Save/Restore menu.
- 5.) Select ALL
- 6.) Select SAVE
- 7.) When the save operation completes, select FILE and QUIT from the pull-down menu.
- 8.) Remove the DVD from the drive.

Chapter 8

Customer Options Installation & Verification

Note: Only use the Installation manual that arrives with your system for installation. Any other revisions of this manual may not exactly match your system.

Section 1.0 DICOM Network

1.1 Introduction

DICOM networks operate on the **tasks** or services that various devices on the network use or provide. These services are labeled as Application Entity Titles (AE Titles). The CT scanner system is uses six DICOM Network Services and is provides two DICOM Services:

1.1.1 As a DICOM Service User:

- Send or "**Push**" images to another network device.
- Send or "**Push**" images to a DICOM Printer.
- Review image database on another device and retrieve or "**Pull**" selected images from that device (Query/Retrieve User).
- Send or "**Push**" images to a an image storage device and obtain confirmation that the images were archived (Storage Commitment).
- Obtain Patient Worklist Information from the Hospital HIS/RIS System.
- Store images on MOD media.

1.1.2 As a DICOM Service Provider:

- Receive "**Pushed**" images from another network device.
- Allow another network device to review the image database and to retrieve or "**Pull**" selected images (Query/Retrieve Provider).

For each DICOM Service that the CT system is a **User** (except for storing images on MOD media), you must **declare** this device on the CT system using three menu selections. For some devices, you must declare not only the device, but each service (AE Title) that the device provides.

For example, you may need to declare a PACS System twice on the CT system: once as a destination to **push** images and, second, as destination that provides storage commitment capability after images have been **pushed**.

For each DICOM Service that the CT system is a **Provider**, you must **declare** the CT system on the network device that is using these services.

Information required to complete configuring a hospital DICOM network is provided by:

- The hospital network administrator (hostnames, IP Addresses)
- The DICOM Conformance Statement document (AE Titles, Port Numbers), provided with each DICOM compatible network device on the network.

1.2 Preparation

1.2.1 Network Physical Requirements

Before setting up the CT scanner system on the hospital network, verify the following physical items are complete:

- Scanner console, monitor, keyboard, and mouse are installed and connected.
- CT system power is ON.
- Hospital Ethernet network RJ45 Class IV twisted pair cable is connected to the scanner console network receptacle.
- Hospital network connection is operational and is running 10baseT or 100baseT.

1.2.2 Network Identity Information

You need to gather network identity information to do the following tasks:

- Declare the CT system on the network
- Declare the DICOM remote hosts (PACS systems, archival devices, review workstations) on the CT system.
- Declare the DICOM Hospital HIS/RIS Interface devices (Mitra and others) on the CT system.
- Declare the DICOM on the CT System,

Ensure the following network identity information is available:

- From the Hospital Network Administrator:
 - Hostname (No more than 16 Characters).
 - Internet Protocol (IP) Address.
 - Subnet Net Mask IP Address (if applicable).
 - Broadcast Address (if applicable).
 - Network Protocol (DICOM for CT Systems)
- From the Remote Host Device DICOM Conformance Statement Document:
 - DICOM Application Entity Title or AE Title (DICOM service that remote host provides or uses).
 - DICOM Listening Port Number.
- From the HIS/RIS Interface Device DICOM Conformance Statement Document:
 - DICOM Application Entity Title or AE Title (DICOM Service that the HIS/RIS interface provides).
 - DICOM Listening Port Number.
- From the Printer DICOM Conformance Statement Document:
 - DICOM Application Entity Title or AE Title (DICOM service that remote host provides or uses).
 - DICOM Listening Port Number.

1.3 Procedures

1.3.1 Enter Configuration Routine

- 1.) On the operator's console, open a shell window.
- 2.) Enter root as a superuser:
Type: `su` - **ENTER** at the prompt.
Type: `#bigguy` **ENTER** at the password prompt.

- 3.) Change directory to scripts.
Type: `cd /user/g/scripts` **ENTER** at the root prompt.
- 4.) Launch the Install Utility:
At the prompt, type: `reconfig` **ENTER**
The OC displays the Install Utility Window as shown in [Figure 8-1](#).

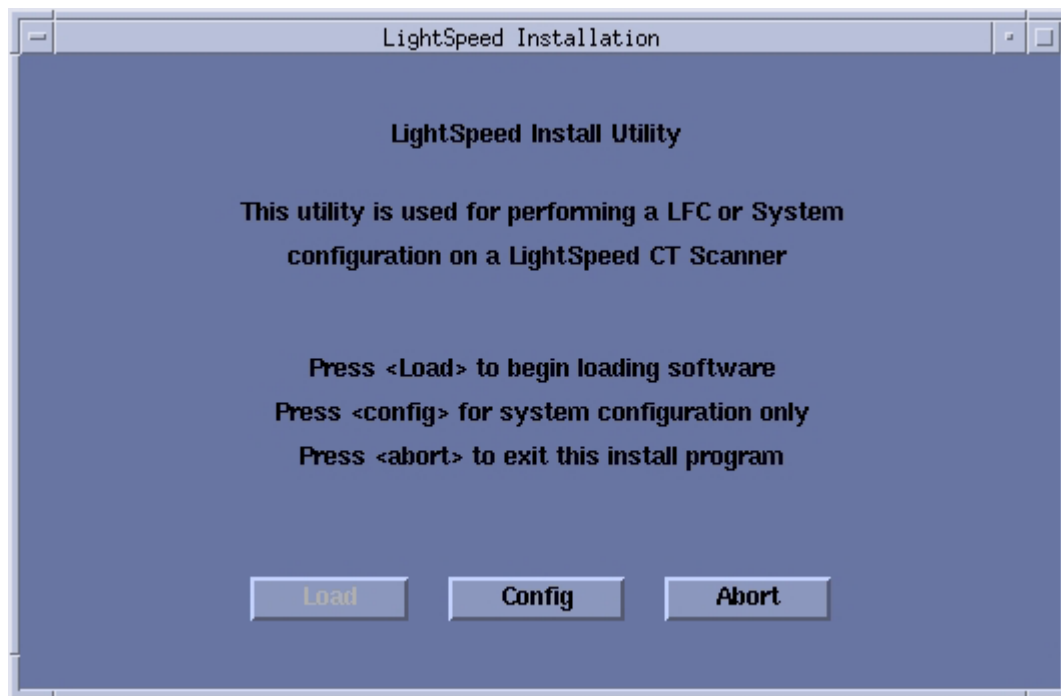


Figure 8-1 Install Utility Window

5.) Enter the Configuration Routine:

Click the CONFIG button.

The OC displays the System Configuration - System Settings screen, as shown in [Figure 8-2](#).

CT Software Configuration

System Preferences Hardware Network

File File File File Accept Quit

System Settings

Hospital Name: G.E. Medical Systems

Service ID: GE_SERVICE

Next Patient Exam #: 1639

Next Diagnostic Exam #: 50000

Time Zone: Tokyo

Time Zones:

- Africa
- America
- Arctic
- Asia
- Atlantic
- Australia
- Europe
- Indian
- Pacific

Selected Time Zone: Tokyo

Ujung_Pandang

Ulaanbaatar

Ulan_Bator

Urumqi

Vientiane

Vladivostok

Yakutsk

Yekaterinburg

Yerevan

Mobile System?

Yes No

Recreate Scan Disk Array?

Yes No

WARNING: Removes all scanfiles

Rebuild Scan Disk Array?

Yes No

Energy Saving?

On Off

Figure 8-2 System Settings Screen

1.3.2 Configure Network Settings

This screen allows you to declare the CT system on a hospital network. Key information such as Host Name, IP Address, Net Mask (for CT systems on a subnet) must be obtained from the hospital network administrator.

- 1.) Select the **NETWORK** button to display the Network Settings screen as shown in [Figure 8-3](#).

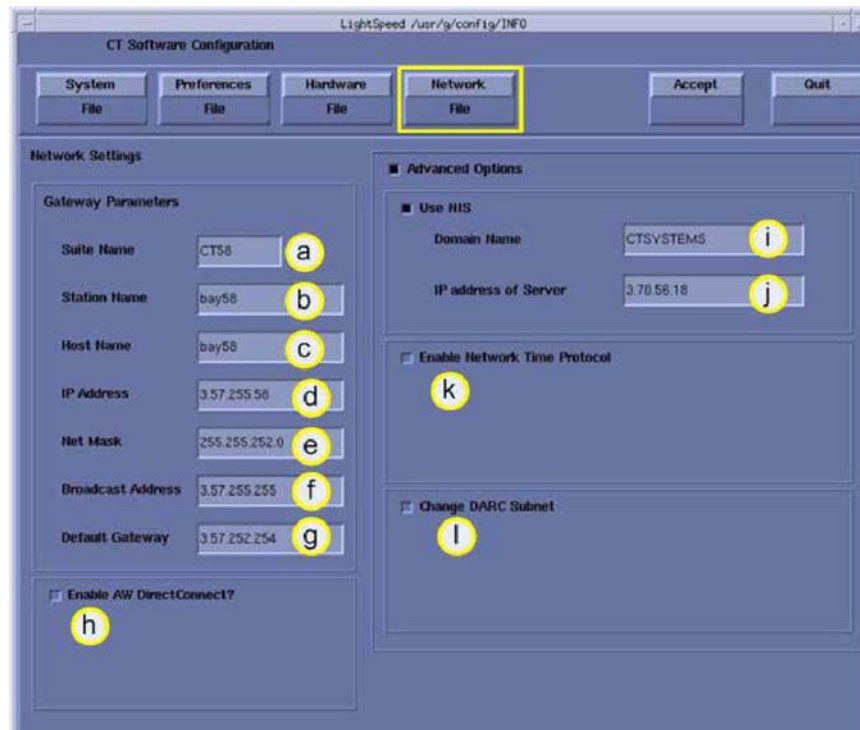


Figure 8-3 Networks Settings Screen

- 2.) Enter the **Suite Name**.
The Suite Name is a means of identifying this particular CT system as a part of a group of CT Systems in a suite configuration. This Suite Name will appear on all image headers.
The Suite Name must start with a letter, followed by three alphanumeric characters (total MUST be four characters long). The name of the OC interface will be `<Suite Name>_oc` and the SBC interface will be `<Suite Name>_sbc`.
- 3.) Enter the **Station Name**.
It cannot exceed 16 characters
It can only contain **a** through **z**, and **0** through **9**
Example: `stmary` or `ct01`
- 4.) Enter the hospital provided **Host Name**.
The Host Name identifies the network hostname and AE Title of the CT system.
The Host Name:
 - **MUST NOT** be `<Suite Name>_oc` or `<SUITE NAME>_OC`.
 - **MUST NOT** exceed 16 Characters.
 - **MUST** only contain the following characters: **A** through **Z**, **a** through **z**, **0** through **9**
- 5.) Enter the hospital provided **IP Address**.
- 6.) Enter the hospital provided **Net Mask** (if the CT system is on a subnet).
- 7.) Enter the **Broadcast Address**:
The Broadcast Address should be the same as the IP Address except for the bits of the host id portion (last digit group) set to 1s or 0s depending on the configuration of the network. The standard default is 1s but older SunOS machines used 0s.

Example: If the IP Address is 192.100.9.17, the Broadcast Address should be 192.100.9.255 if the network is configured to use 1's to specify the broadcast address.

If the network contains genesis based scanners or other SunOS 3.5 or 4.1 computers, the Broadcast Address should be 192.100.9.0.

- 8.) Enter the hospital provided Default Gateway IP Address in the Default Gateway field (if applicable). If the site network does not use a default gateway, leave the field blank.
- 9.) Select NIS (Yellow Pages database) Advanced Option only if requested by the hospital network administrator as follows:
 - a.) Select ADVANCED OPTIONS button on the Network Settings screen.
 - b.) Select Use NIS? button.
 - c.) Enter the hospital provided Domain Name.
- 10.) Record all the Network parameters in the *Software Installation Procedures* Document, or on the worksheet in [Appendix E on page 283](#).

1.3.3 Initiate System Reconfiguration

- 1.) Select ACCEPT on the System Configuration Screen.

The system loads the application software, OS patches, and kernel changes, and configures the system on both the OC and the SBC.

This loading process takes approximately 15 minutes. While the load is going on, the results are displayed in a Shell window, which closes when the loading process is complete. All the window output is logged to a file named:

```
/var/adm/install.log.YYYYMMDDWWHHMMSS.
```

(Where YYYYMMDDWWHHMMSS is the Date/Time that the loading process was started.)
- 2.) When the loading process and configuration changes are complete, the system displays a prompt to reboot. Click on YES.
- 3.) The system will automatically login as ctuser after the reboot. Select OK on the Autostart Disabled popup message.
- 4.) To startup Applications, in the console Shell window, type **startup** ENTER.

1.3.4 Declaring Remote Hosts on the CT System

- 1.) On the OC, select the IMAGE WORKS icon.
- 2.) Select NETWORK.

1.3.5 Declaring DICOM Remote Hosts on the Scanner

Enter Remote Host Configuration Screen



- 1.) On the OC, select the IMAGE WORKS icon.
- 2.) Select TOOL.

Source: Local DB

Exams: 1

| Exam | Station name | Name | Date | Description | Modality | MPPS | Archived | Transferred |
|------|--------------|--------------|-----------|-------------|----------|------|----------|-------------|
| 161 | ct13 | 21CFR1020.33 | Mar 15 12 | | CT | | | No |

Series: 0

| Series | Type | Images | Description | Modality | Manufacturer | MPPS | Archived | Transferred |
|--------|------|--------|-------------|----------|--------------|------|----------|-------------|
|--------|------|--------|-------------|----------|--------------|------|----------|-------------|

Images: 0

| Image | Date | Image Size |
|-------|------|------------|
|-------|------|------------|

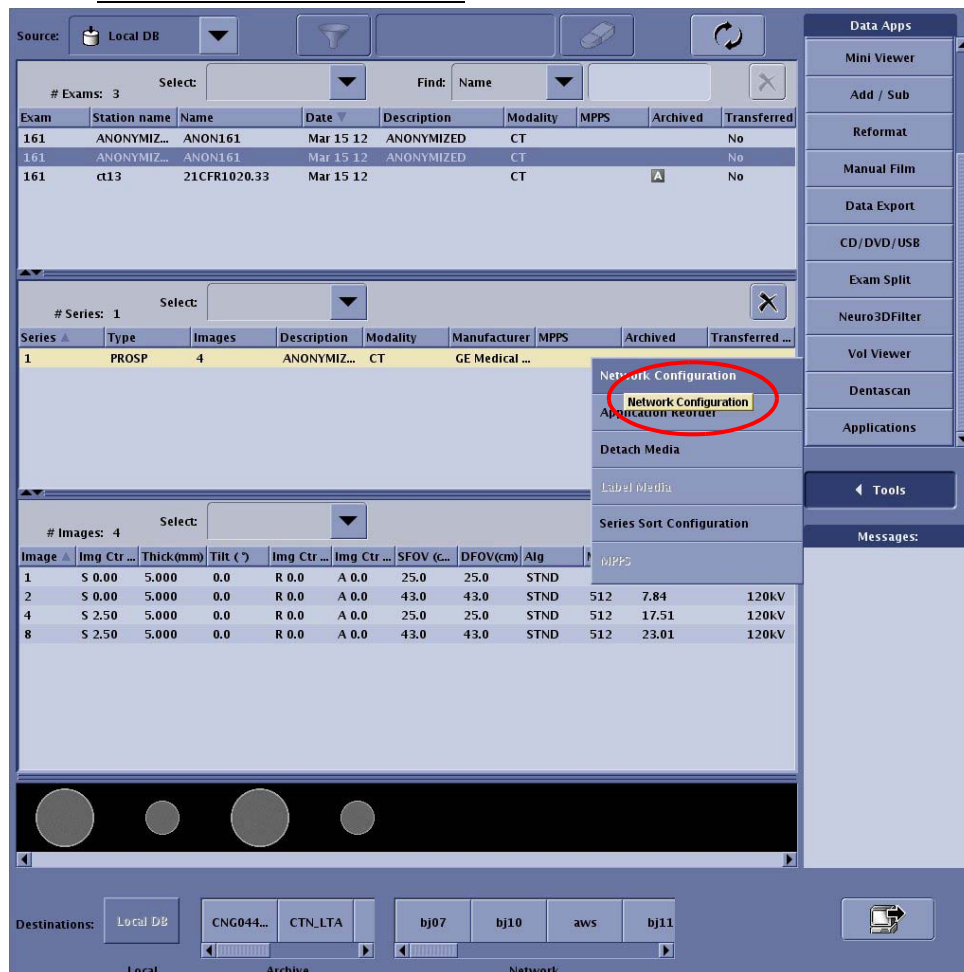
Data Apps

- Viewer
- Anonymize Patient
- Edit Patient
- Image Header
- Mini Viewer
- Add / Sub
- Reformat
- Manual Film
- Data Export
- CD/DVD/USB
- Exam Split
- Tools**

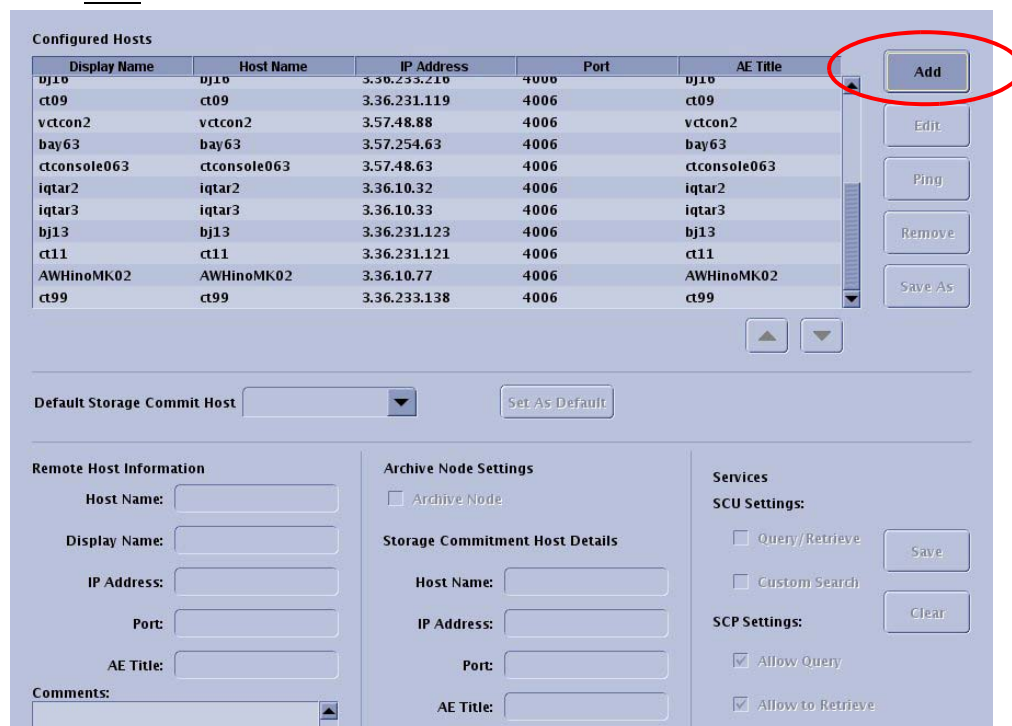
Messages:

Interchange device Flash Disk_1 has been removed. Any Restore jobs from it will be removed from the Job Manager.

3.) Select NETWORK CONFIGURATION.



4.) Select ADD.



5.) Detail Setting of Remote Host

Repeat the following procedure for each DICOM remote host device that the customer expects to have this CT system communicating with.

- 1.) Enter the hospital provided Host name.
- 2.) Enter the hospital provided IP Address.
- 3.) Enter the TCP/IP Listening Port Number from the DICOM Conformance Statement provided with the device.
- 4.) Enter the AE Title from the DICOM Conformance Statement provided with the device.

Application Entity Titles (also known as ACR-Nema or Dicom Name) refer to the DICOM Network Services that a device provides to the CT System. For most devices, the AE Title is the same as the hostname (CT systems are equipped with this feature).

However, some devices such as PACS systems may have separate AE Titles and port numbers for each of the services that the PACS system provides. In these cases, you must enter a separate remote host (same hostname and IP Address) for each of the independent AE Title Services that the host provides (one host as an image **push-to** destination, another host as a **query/retrieve** provider, and another host as a **storage/commitment** provider).

Be sure to review the DICOM Conformance Statement for each device that will provide a remote host network service for the CT system (image **push-to** or store destination, Query/Retrieve, and Storage Commitment) to ensure that each service is correctly configured.

- 5.) Select the correct **Archive Node** choice for the device. The Archive Node selection defines the ability of the remote host to act as a DICOM Storage/Commitment provider and indicate to the operator that a study/series/image was archived.
 - Select **Archive Node** if the device is the hospital designated DICOM Storage/Commitment Provider. During an Application Study Archive process, the local browser screen will indicate **Archive Status = Y** to the operator.
 - Don't select **Archive Node** if the device is not a DICOM Storage/Commitment Provider.
- 6.) **SCU Settings**: The following two selections allow you to selectively block the remote host from using the Optima CT680 Series DICOM services as a provider (image **push-to** destination, and a **Query/Retrieve** provider).
 - **Query/Retrieve**: select if the customer wants the remote host to be able to review the image database (query) and **pull** selected images from the database. Don't select if the customer does not want the remote host to have this ability.
 - **Custom Search**: This selection allows the CT scanner to selectively search through the remote host's image database when the operator is using remote browser screen to **query** the remote host. The search parameters that the CT system allows the customer to use are: last name contains, patient ID, exam number, accession number, and exam date.
 - * Select if the device supports custom searches as part of the devices **Query/Retrieve** DICOM Provider service.
 - * Don't select if the device does not support custom searches.
- 7.) Select the correct **SCP Settings**: setting.
- 8.) Record all the remote host network parameters for each remote host in the *Software Installation Procedures* Document.
- 9.) Select **SAVE** to store the parameter settings of the remote host.

1.3.6 Declaring the CT System on Remote Hosts

Refer to the appropriate service manual provided with the DICOM Protocol device or system to find instructions how to declare the CT System as a DICOM remote host.

The CT System provides two DICOM Services as a provider to remote hosts:

- A remote host can **push** images to the CT image database.
- A remote host can review the CT image database (query) and **pull** selected images (retrieve).

Use the following parameter information to configure the DICOM device/system to either **push** images to the CT scanner and/or perform a **Query/Retrieve** operation:

- **Hostname**: Provided by the Hospital Network Administrator. Exactly the same scanner assigned hostname entered in Network Configuration Screen.
- **AE Title**: Exactly the same entry as the Hostname.
- **IP Address**: Provided by the Hospital Network Administrator. Exactly the same scanner assigned IP Address entered in Network Configuration Screen.
- **Network Protocol**: DICOM 3.0.
- **Port**: For all DICOM service that the CT System provides, use 4006.
- **Provider Type**: This field concerns the Optima CT680 Series DICOM **Query/Retrieve** provider capability. All CT systems are study root systems, which allow queries at the exam, series, and image level.
- **Support Worklist**: This field concerns whether a DICOM **Query/Retrieve** provider capable device or system supports a filter search of the image database. All CT systems support a filtered search of the image database as part of the Optima CT680 Series DICOM **Query/Retrieve** provider capability.

Section 2.0 DICOM HIS/RIS Setup

2.1 Prerequisites

Most hospital HIS/RIS systems are not DICOM compatible and require a DICOM HIS/RIS Worklist Interface to provide patient scheduling information to the CT system. Contact your local HNS support engineer to determine exactly what DICOM HIS/RIS Interface is appropriate for the customer. In addition, the CT system must have the ConnectPRO software option installed to utilize the DICOM Protocol Worklist capability.

2.2 Loading ConnectPRO Software Option on the CT System

- 1.) If you are not on the Service Desktop, click on the SERVICE DESKTOP icon.
- 2.) Click on the CONFIGURATION icon.
- 3.) Click on INSTALL OPTIONS.
- 4.) Select INSTALL and click START. The console displays the Software Options window as shown in [Figure 8-4](#).

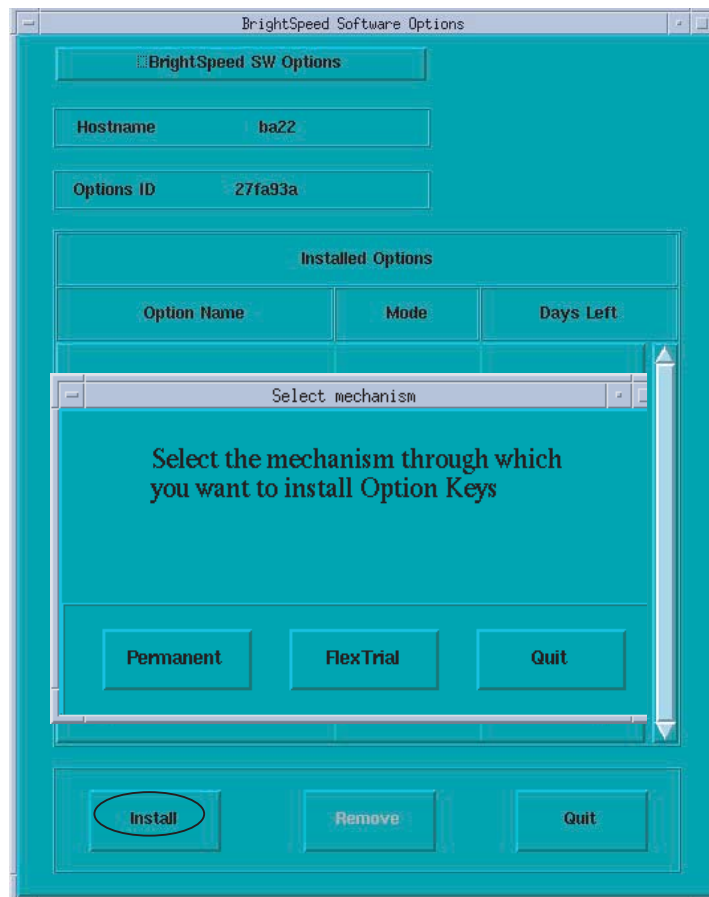


Figure 8-4 Options Window when First Selected

- 5.) Insert the ConnectPRO Options DVD into the DVD drive.
- 6.) Click on OK to continue.
- 7.) On the Software Option window, select the CONNECTPRO option in the Available Options window.

- 8.) Click on the INSTALL button.

The console may display a message box during the software loading operation. When the system has completed loading the software:

- the Installed Options window displays the ConnectPRO option, and
- the console displays the ConnectPro Setup window as shown in [Figure 8-5](#).

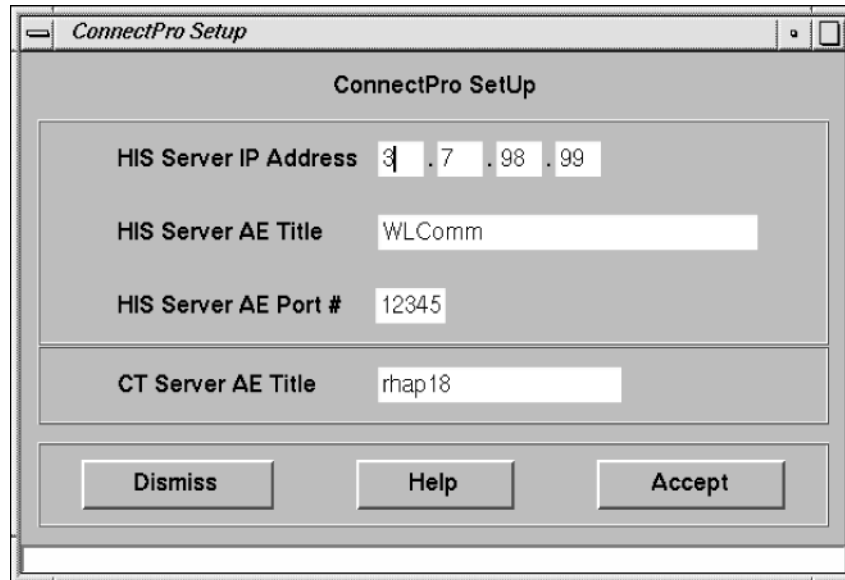


Figure 8-5 ConnectPro Setup Screen

- 9.) Enter the hospital provided HIS Server IP Address.
- 10.) Enter the HIS Server AE Title from the DICOM HIS/RIS Interface device DICOM Conformance Statement document.
- 11.) Enter the HIS Server AE Port # from the DICOM HIS/RIS Interface device DICOM Conformance Statement document.
- 12.) Record all the ConnectPRO HIS/RIS Network parameters in the *Software Installation Procedures* document.
- The system will automatically load the LightSpeed CT Server AE Title (Hostname of the system).
- 13.) Click on the ACCEPT button. The system will check valid setup entries, execute a perl script that makes changes to the configuration files for HIS/RIS, and return to the Software Option window shown in [Figure 8-4](#).
- 14.) Click on the QUIT button and the subsequent OK button in the message window.
- 15.) Remove the DVD from the DVD drive, and write protect the side containing the ConnectPRO option.

2.3 Troubleshooting Tips

The following is a summary of troubleshooting information for DICOM print that was gathered during software testing and validation of the DICOM print feature.

There is also a significant amount of additional troubleshooting procedures, and the theory of the DICOM print feature in the System Service Manual. Should you have problems installing a DICOM print camera, first read the information in System Service Manual.

ERROR BRINGING UP THE CAMERA INSTALLATION/FILMING APPLICATION

- **Symptom:** After creating/modifying the DICOM print camera the install camera interface does not come up and the filming application indicates it cannot bring up the film composer.
Cause: The configuration field contains invalid information such as a backslash (\) as the final character in the field or brackets ({}).
- **Solution:** The camera.dev file in `~ctuser/app-defaults/devices` must be manually edited to remove the offending characters in the set configuration line. Invalid characters include \{ }

CONFIGURATION INFORMATION FIELD

- **Symptom:** Cannot view the entire configuration field (> 25 characters)
- **Solution:** Hold down the middle mouse button and move the field contents

NEED TO SET DICOM PRINT ATTRIBUTES NOT SUPPORTED BY SOFTWARE

- **Symptom:** User wants the white border around each image box ON/OFF permanently for this system and it cannot be set as the default for the camera.
- **Solution:** Using your favorite editor, add the following line to the camera.dev file located in `~ctuser/app-defaults/devices` after the DICOM print device has been otherwise configured.

| | |
|--------------------|----------|
| For Trim Off - set | TRIM NO |
| For Trim On - set | TRIM YES |
- **Symptom:** DICOM print camera supports multiple film sizes and the user only wants to print if the film size is correct for LightSpeed 7.X (14x17). [Otherwise the camera will queue the films or return an error causing the queue to pause (based upon the DICOM print camera specifications).]
- **Solution:** Using your favorite editor, add the following line to the camera.dev file located in `~ctuser/app-defaults/devices` after the DICOM print device has been otherwise configured.

| | |
|----------------------------------|--------------------|
| To force a 14x17 film size - set | filmSize 14INX17IN |
|----------------------------------|--------------------|

NEED TO PREVENT DICOM PRINT ATTRIBUTES FROM BEING SENT TO DICOM PRINT CAMERA

- **Symptom:** Some DICOM print attributes are optional, and may result in fatal errors. For example, the Fuji camera does not support the Empty Image Density parameter for the film box.
- **Solution:** Using your favorite editor, add the following line(s) to the camera.dev file located in `~ctuser/app-defaults/devices` after the DICOM print device has been otherwise configured.
 - To prevent sending the Smoothing Parameter set `FB_Smooth FALSE`
 - To prevent sending the Border Density set `FB_Border FALSE`
 - To prevent sending the Empty Image Density set `FB_EID FALSE`
 - To prevent sending the Minimum Density set `FB_MinD FALSE`
 - To prevent sending the Trim Parameter set `FB_Trim FALSE`

ERROR TRYING TO CONNECT TO THE DICOM PRINT CAMERA

- **Symptom:** DICOM print server can be reached (ping), but Application error indicates "Unable to start filming interface" and the help message talks about running the install.dasm (Association Error)
- **Solution:** The system is unable to complete the association. Check the `AE Title` and the `Port number` of the DICOM print server and correct them through the Install Camera procedure.

FILM COMPOSER ERROR NOT USABLE

- **Symptom:** Film composer error says "unrecognized status - code 0"
- **Solution:** Review the log file, the attention and status windows. These areas have the correct filming status (for example, **film jam** and **supply empty**).

DEBUGGING CONNECTION ISSUES DIFFICULT

- **Symptom:** The timeouts for the DICOM print are very long, which means one needs to wait a long time before you know the application is not working.
- **Solution:** The timeouts for the DICOM print were setup to ensure that the system would work regardless of whether the DICOM print camera was on a LAN or a WAN halfway around the world. The DICOM print timeouts for the association and DIMSE classes (for example, **N-GET**, **N-DELETE**) can be modified within the DICOM print camera installation. They can be reduced down to 90 seconds.

DICOM PRINT ERROR ON N-GET TIMEOUT CONFUSING

- **Symptom:** When the N-GET timeout goes off, the error message in the prslog file will be "Could not get printer status, invalid command sequence for N-GET".
- **Solution:** When the user sees the above error they may want to consider that the issue may be an inactivity timer on the N-GET DIMSE service.

DICOM PRINT CAMERA SLIDE SUPPORT

- **Symptom:** Current implementation of DICOM print does not allow selection of slide format.
- **Solution:** Feature not currently supported. Possibly in future releases.

CONFUSION ON FILM FORMAT NOTATION

- **Symptom:** GE Healthcare Laser Camera and DICOM Print film format notations are opposite.
- **Solution:**
 - GE Healthcare Laser Camera film format notation has always been row x col (for example, 12 on 1 = 4x3)
 - DICOM Print Standard film format notation is col x row (for example, 12 on 1 = 3x4)

Section 3.0 Network Connections

BROAD-BAND

Broadband is considered the standard network connection for system. (A dial-up modem is optional).

Broadband connections should use the appropriate ethernet cables for these connections.

The CT system is connected to the network through the Console.

- An ethernet cable (not to exceed 10 feet) should be provided by the customer, and it is used to connect the console to a wall box. Use of STP (Shielded Twisted Pair) cable is not allowed.
- Some customer-site units may require cable duct-work or conduit to route connecting network cables to the workstation, camera and console.
- The run from the hospital switch to the CT wall outlet must not exceed 290 ft. (88m). Bandwidth performance is degraded when the length reaches 300 ft. (91m) or greater.
- For the optional modem: **Two phone lines should be provided by the facility.** One line is for use with a modem and must be an analog line. The second line is a voice only line.
- All cables connection via Switch Hub, Switch Hub located on the left bottom of the console, Plug cables into Switch Hub on console.

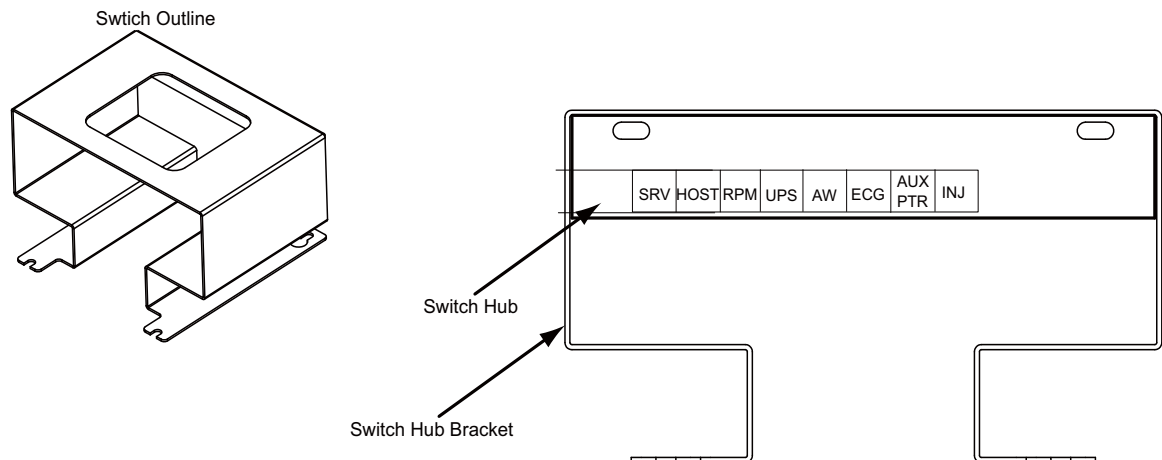


Figure 8-6 Switch Hub

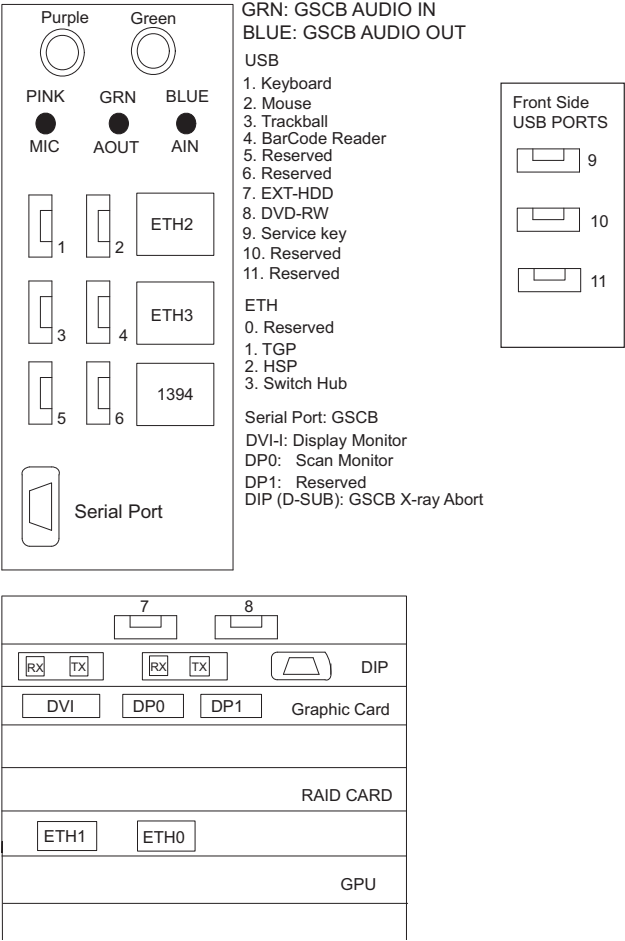


Figure 8-7 NIO64 Console Rear View

US PROCESS OVERVIEW

The United States network connectivity requirement for this product is broad-band. The US process relies on the Install Specialist to select a Customer Champion and identify an IT contact for the site. Together, those individuals then complete a site assessment to gauge what tasks are needed to fulfill the connection.

Anyone can contact the GE Connectivity team at 800.321.7937, Option #3, with questions.

CUSTOMER BROADBAND RESPONSIBILITIES

Provide GE Healthcare Installation Specialist with an accurate site address, telephone number, contact name, and e-mail address for the:

- Customer Champion
 - Coordinate VPN activities between Radiology/Cardiology and the Information Technology (IT) departments
 - Act as a focal point in assuring site broadband infrastructure meets GE Healthcare requirements for connection as determined by a mutual assessment with the GE Healthcare Connectivity team.
- IT Contact
 - Complete an equipment assessment with GE Healthcare Connectivity team to determine site readiness for broadband
 - Work with the Customer Champion to complete any identified infrastructure changes
 - Provide IP addresses for new CT equipment
 - Provide a VPN compatible appliance that will support the IPSec tunneling protocol and 3DES data encryption
 - To utilize an Internet Service Provider that supports static routing

Section 4.0 Special operation about Smart Step/Smart View option installation

If no camera setting was existed, dummy camera setting shall be set in order to prevent multiple message pop-up (no print installed). Execute the following procedure.

- 1.) If any DICOM camera or Postscript printer will be connected to this system, no action is required. Proceed to next step.
- 2.) If DICOM camera or Postscript printer is not planned to be connected to this system, configure a dummy camera setting in *Common Service Desktop -> Configuration -> Install Camera*.

Select *Other DICOM Protocol Camera* in Camera selection screen (Figure 8-8) and enter dummy information as shown in Figure 8-9

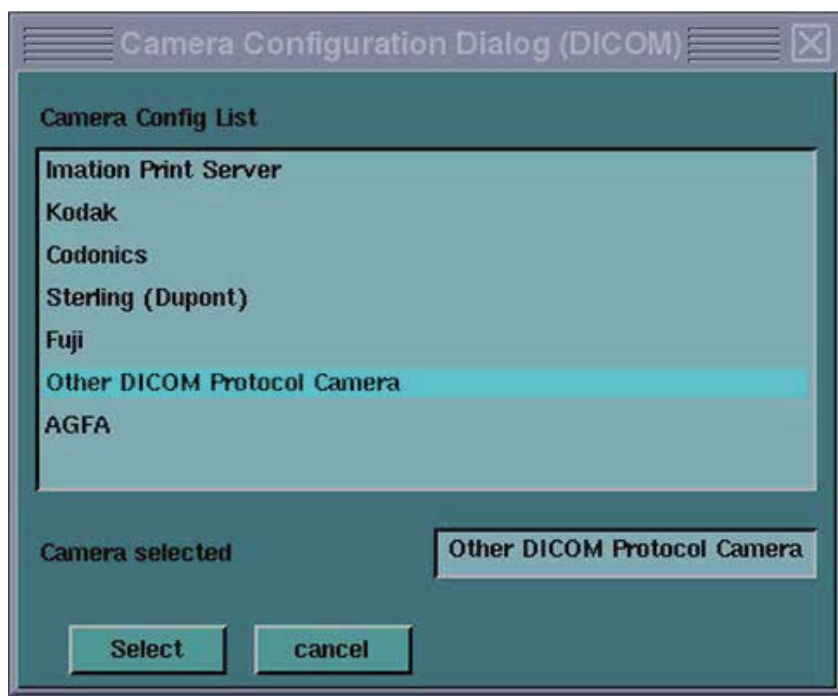
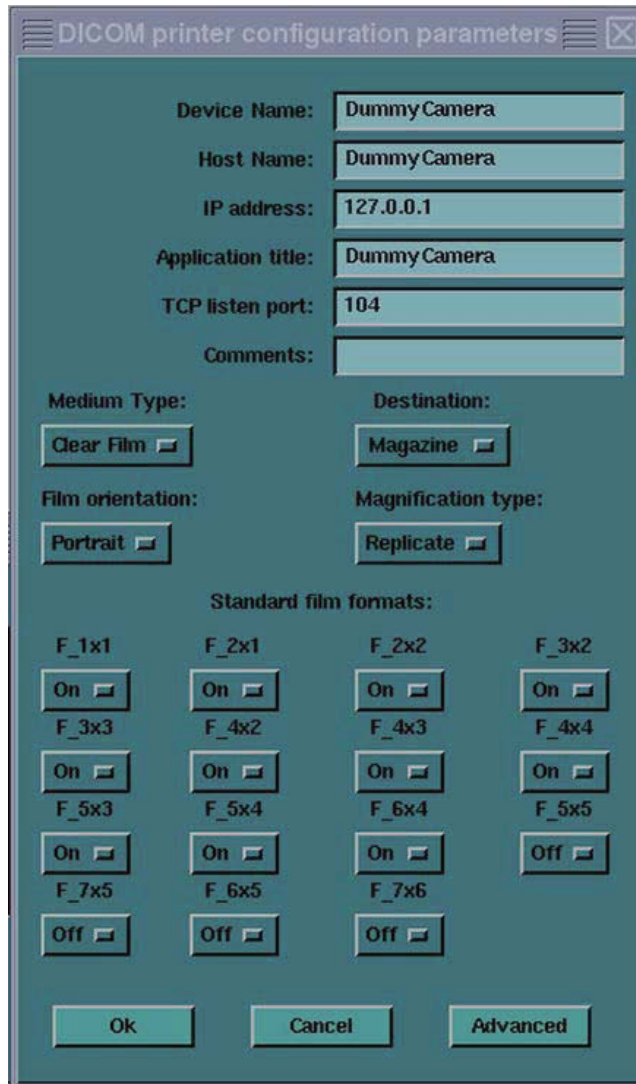


Figure 8-8 Camera selection screen



The image shows a 'DICOM printer configuration parameters' dialog box. It contains several input fields for device information, a section for medium and destination settings, film orientation and magnification type, and a grid of standard film format options. At the bottom are 'OK', 'Cancel', and 'Advanced' buttons.

| Field | Value |
|--------------------|--------------|
| Device Name: | Dummy Camera |
| Host Name: | Dummy Camera |
| IP address: | 127.0.0.1 |
| Application title: | Dummy Camera |
| TCP listen port: | 104 |
| Comments: | |

| Medium Type: | Destination: |
|-------------------------------------|-----------------------------------|
| Clear Film <input type="checkbox"/> | Magazine <input type="checkbox"/> |

| Film orientation: | Magnification type: |
|-----------------------------------|------------------------------------|
| Portrait <input type="checkbox"/> | Replicate <input type="checkbox"/> |

Standard film formats:

| | | | |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| F_1x1 <input type="checkbox"/> | F_2x1 <input type="checkbox"/> | F_2x2 <input type="checkbox"/> | F_3x2 <input type="checkbox"/> |
| F_3x3 <input type="checkbox"/> | F_4x2 <input type="checkbox"/> | F_4x3 <input type="checkbox"/> | F_4x4 <input type="checkbox"/> |
| F_5x3 <input type="checkbox"/> | F_5x4 <input type="checkbox"/> | F_6x4 <input type="checkbox"/> | F_5x5 <input type="checkbox"/> |
| F_7x5 <input type="checkbox"/> | F_6x5 <input type="checkbox"/> | F_7x6 <input type="checkbox"/> | |

Buttons: OK, Cancel, Advanced

Figure 8-9 DICOM Camera Dummy Information

Section 5.0 Special operation about DentaScan option Installation

In the Russian language was set, it shall be changed to English when DentaScan option is installed.

Procedure:

- 1.) Change the language setting to English. Then reboot the system.
- 2.) Install DentaScan option from option install menu.
- 3.) Return the language setting to original one. Then reboot the system.
- 4.) Execute "install camera" command to start set up procedure.

This must be done at LFC or Restore State operation with DentaScan option.

LFC:

After application DVD is set, reconfig. is requested after INFO file loading from System State. Change the language setting to English, execute LFC procedure. The setting is automatically returns to Russian after final Restore State.

Restore State:

When Restore State is done with All or Option is selected, language setting must be English.

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Chapter 9

System-Level Safety Tests

You must complete these tests after all options are installed. They cover three safety and leakage current checks:

- Patient Touch Current Test (completed after installation)
- System Ground Resistance Measurement (completed during installation)
- Ground Current Typical (completed after installation - optional)

Refer to the Optima CT680 Service Methods CD to locate the latest Enclosure Leakage (Patient Touch) and System Chassis Leakage Tests under the **Functional Checks** Chapter.

Appendix E

System Configuration Data Sheets

Section 1.0 Requirements

- Record valuable system information in the data sheets that follow. Consult with your customer or network administrator to obtain the information. Understanding how the customer plans to use their CT scanner and their network and filming expectation reduces the time required to reconfigure the system.
- [Table E-1 Manual Film Composer Options, on page 283](#)
 - [Table E-2 System Network Configuration, on page 284](#)
 - [Table E-3 Networking Application \(Image transfer\) Configuration, on page 285](#)
 - [Table E-4 DASM Laser Camera Configuration, on page 285](#)
 - [Table E-5 DICOM Print Camera Configuration, on page 286](#)
 - [Table E-6 DICOM Print Camera Advanced Configuration, on page 286](#)

Section 2.0 Manual Film Composer Options

| MANUAL FILM COMPOSER OPTIONS | |
|------------------------------|--|
| Slide Format (if available): | |
| Greyscale: | |
| Auto Printing: | |
| Auto Clear Page: | |
| Icon Labels: | |
| Expose Order: | |
| No. of Copies: | |

Table E-1 Manual Film Composer Options

Section 3.0 System Network Configuration

| SYSTEM NETWORK CONFIGURATION | | | |
|------------------------------|----------------------------|-----------------------------|--------------|
| | FIELD NAME: | SETENV NAME: | FIELD VALUE: |
| System Settings: | Service ID | SERVICE_ID | |
| | Hospital Name | HOSPITAL_NAME | |
| | Exam Number * | * Ask customer or check log | |
| | DAS Type | DASTYPE | |
| | PDU Type | PDUTYPE | |
| Network Settings: | Gateway Host Name | GATEWAY_HOSTNAME | |
| | Gateway IP | GATEWAY_IP | |
| | Gateway Net Mask | GATEWAY_NETMASK | |
| | Gateway Broadcast Mask | GATEWAY_BROADCAST | |
| | Suite Name | SUITEID | |
| Option | Network Printer IP Address | | |
| Option | HIS Server IP Address | | |
| Option | HIS Server AE Title | | |
| Option | HIS server AE Port | | |
| Option | CT Server AE Title | | |
| Option | Connect Pro IP Address | | |

Table E-2 System Network Configuration

HOST ETHERNET ADDRESS

_____ : _____ : _____ : _____ : _____

Section 4.0 Network Application (Image Transfer) Configuration

Record the network application (image transfer) configuration.

| NETWORKING APPLICATION (IMAGE TRANSFER) CONFIGURATION | | | | |
|---|-----------------|------------------|-------------|----------|
| AE TITLE OR HOST NAME | NETWORK ADDRESS | NETWORK PROTOCOL | PORT NUMBER | COMMENTS |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Table E-3 Networking Application (Image transfer) Configuration

Section 5.0 Camera Application Configuration

Record the camera application configuration for the DASM or DICOM print camera.

| DASM LASER CAMERA CONFIGURATION | |
|---------------------------------|--|
| Camera Type: | |
| DASM Type: | |
| Film Smooth/Sharp Setting: | |
| Options: | |
| Valid Film Formats: | |
| Default Film Formats: | |

Table E-4 DASM Laser Camera Configuration

DICOM PRINT CAMERA CONFIGURATION

| | |
|------------------------------|--|
| Camera Type: | |
| Host Name: | |
| IP Address: | |
| AE Title: | |
| TCP/IP Listen Port: | |
| Comments (Optional): | |
| Valid Film Formats: | |
| Default Film Formats: | |
| Destination: | |
| Orientation: | |
| Medium Type: | |
| Magnification Type: | |

Table E-5 DICOM Print Camera Configuration

DICOM PRINT CAMERA ADVANCED CONFIGURATION

| | |
|-----------------------------|--|
| Smoothing Type: | |
| Configuration: | |
| Minimum Density: | |
| Maximum Density: | |
| Empty Density: | |
| Border Density: | |
| Association Timeout: | |
| Session Timeout: | |
| N-Set Timeout: | |
| N-Action Timeout: | |
| N-Create Timeout: | |
| N-Delete Timeout: | |
| N-Get Timeout: | |

Table E-6 DICOM Print Camera Advanced Configuration

Appendix F

Symbols

Section 1.0 Symbols












| SYMBOL | PUBLICATION | DESCRIPTION |
|---|-------------|--|
|  | 417-5032 | Alternating Current |
|  | 335-1 | Three-phase Alternating Current |
|  | 335-1 | Three-phase Alternating Current with neutral conductor |
|  | | Direct Current |
|  | 417-5019 | Protective Earth (Ground) |
|  | 348 | Attention, consult ACCOMPANYING DOCUMENTS (For IEC 60601-1 2nd Edition) |
|  | | General Warning Symbol |
|  | 7010-M002 | Attention, consult ACCOMPANYING DOCUMENTS (For IEC 60601-1 3rd Edition) |
|  | 417-5008 | OFF (Power: disconnection from the mains) |
|  | 417-5007 | ON (Power: connection to the mains) |
|  | | Input Power |

Table F-1 Symbols











| SYMBOL | PUBLICATION | DESCRIPTION |
|---|-------------|---|
|  | | Output Power |
|  | | Functional Earth Ground |
|  | | Warning, HIGH VOLTAGE |
|  | | Emergency Stop (For IEC 60601-1 2nd Edition) |
|  | | Emergency Stop (For IEC 60601-1 3rd Edition) |
|  | | Type B |
|  | 417-5339 | X-ray Source Assembly Emitting |
|  | 417-5009 | Standby |
|  | | Start |
|  | | Table Set |

Table F-1 Symbols




| SYMBOL | PUBLICATION | DESCRIPTION |
|---|-------------|---|
|  | | Abort |
|  | | Intercom |
|  | | (on Operator Console) Power On: light on Standby: light off |

Table F-1 Symbols

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